

**FRENCH LANDING – PHASE II
LANDSCAPE & IRRIGATION IMPROVEMENTS**

Van Buren Township, Michigan

SPECIFICATIONS

Russell Design, Inc.
Landscape Architects
Site Planners

RD Job No.
V05-221

June 21, 2022

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Charter Township of Van Buren
French Landing Park Improvements – Phase II
Project Number V05-221

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Charter Township of Van Buren
French Landing Park Improvements – Phase II
Project Number V05-221

INFORMATION SHEET

OWNER: Charter Township Of Van Buren
46425 Tyler Road
Van Buren Township, Michigan 48111

SITE LOCATION: 12090 Haggerty Road
Van Buren Township, Michigan

SCOPE OF WORK: Selective Demolition, Concrete and Asphalt Paving, Segmental Retaining Wall,
Masonry, Fencing, Pipe and Tube Handrails, Landscape and Irrigation

WORK BY OTHERS: None

SCHEDULE: Commence: On or Before August 22, 2022
Completed by: November 11, 2022

NON MANDATORY
PRE-BID MEETING NONE

PRE-BID LOCATION NONE

BID DUE DATE: July 19, 2022 @ 2:00pm Eastern Time

DELIVER **THREE (3)**
COPIES OF BID TO: Charter Township of Van Buren (Clerk's office)
46425 Tyler Road
Van Buren Township, Michigan 48111

ENVELOPE: **Sealed and Clearly Labeled:**
“PROPOSAL FOR FRENCH LANDING – PHASE II - PARK IMPROVEMENTS”

SECTION 00 1113 – ADVERTISEMENT FOR BIDS

Charter Township of Van Buren

Charter Township of Van Buren French Landing Park – Phase II Improvements

1. RECEIPT OF BIDS

The Charter Township of Van Buren, will receive sealed Bids for construction of the Charter Township of Van Buren French Landing Park Improvements at the Office of the Township Clerk, 46425 Tyler Road, Charter Township of Van Buren, MI 48111 until Tuesday, July 19, 2022, at 2:00 p.m., local time. No Bids will be received after that time. Bids will be publicly opened and read aloud in the Denton Room at Township Hall.

The project site is located at 12090 Haggerty Road, Charter Township of Van Buren, MI 48111. (South of I-94)

2. SCOPE OF PROJECT

Tree Protection Measures

Soil Erosion and Sedimentation Control (including permit)

Selective Site Demolition

Field Engineering and Layout

Earthwork

Concrete Paving

Asphalt Paving

Handrails

Segmental Retaining Wall

Landscape Plantings and Accessories

Masonry Piers and Fencing

Site Furniture Assembly and Installation (The Township will purchase the furniture)

Fine Grading and Sodded Lawn (Base Bid)

Fine Grading and Seeded Lawn (Alternate 1)

Irrigation System

3. FINANCING

The Charter Township of Van Buren Township is an equal opportunity employer. This project will be funded by The Charter of Van Buren Township General Fund.

4. ISSUING OFFICE

Bidders should direct questions and correspondence to Russell Design, Inc. 114 Rayson Street, Suite 2A Northville, Michigan 48167. (248) 374-3222. Email: marcr@russelldesign.net

5. OBTAIN BIDDING DOCUMENTS

Bid Documents will be available commencing June 21, 2022 at 2:00pm. local time on the Michigan Inter-governmental Trade (MITN) website:

<https://www.bidnetdirect.com>

Obtaining Bidding Documents from any source not identified herein may result in failure to receive addenda, corrections, or other revisions that may be issued.

7. BID SECURITY

Bid security in the amount, form and subject to the conditions provided in the Instructions to Bidders must be submitted with each Bid.

8. WITHDRAWAL OF BIDS

Bids may not be withdrawn for a period of 60 days after the actual date of opening thereof. This time period may be extended by mutual agreement of the Owner and any Bidder or Bidders.

9. RIGHT TO REJECT BIDS

The Charter Township of Van Buren reserves the right to waive any irregularities, reject any and all bids and reserves the right not to award a contract.

10. PREBID CONFERENCE

NONE

11. ON-SITE LABOR

This is not a prevailing wage job.

END OF SECTION 00 1113

SECTION 00 2113 – INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders will have the meanings indicated in the General Conditions (Standard General Conditions of the Construction Contract, EJCDC, No. C-200, 2007 edition) and the Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below which are applicable to both the singular and plural thereof:

- A. Issuing office – the office identified in the Advertisement for Bids, from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents may be obtained as indicated in the Advertisement for Bids.

2.02 Complete sets of Bidding Documents must be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretation resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids on the Work and do not authorize or confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 Each Bid shall contain evidence of Bidder's qualification to do business in the state where the Project is located, or Bidder must covenant to obtain such qualification prior to award of the Contract.

3.02 Bidder is advised to carefully review those portions of the Bid Form requiring Bidder's representations and certifications.

3.03 To demonstrate Bidder's qualifications to perform the Work, within 5 days of Owner's request Bidder shall submit written evidence of:

- A. Financial data, previous experience, present commitments, workers' compensation experience modification rating (EMR) and other such data as may be requested by Owner.
- B. Previous experience in constructing at least 3 projects of a similar type, comparable size and comparable complexity within the past 5 years.

3.04 When so requested, Bidder shall meet with Owner's representatives and give further information in order to determine Bidder's qualifications, responsibility, and ability to perform and complete the Work in accordance with the Contract Documents.

3.05 Owner reserves the right to reject any Bid if the evidence submitted by, or investigation of, a Bidder fails to satisfy Owner that the Bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 Subsurface and Physical Conditions

- A. The Supplementary Conditions identify:

1. Those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site.
2. Those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. Copies of reports and drawings referenced in Paragraph 4.01.A will be made available by Owner to any Bidder on request at the cost of preparation, reproduction, and shipping. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.02 of the General Conditions has been identified and established in Paragraph 4.02 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.02 Underground Facilities

A. Information and data indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site are based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Hazardous Environmental Condition

A. The Supplementary Conditions identify any reports and drawings known to Owner relating to a Hazardous Environmental Condition identified at the Site.

B. Copies of reports and drawings referenced in Paragraph 4.03.A will be made available by Owner to any Bidder on request at the cost of preparation, reproduction and shipping. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established in Paragraph 4.06 of the Supplementary Conditions. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.

4.04 Provisions concerning responsibilities for the adequacy of data, if any, furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated subsurface or physical conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.05 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes, clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.06 Reference is made to the Supplementary Conditions and Division 01 Section “Summary of Work,” for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of contract documents, if any, (other than portions thereof related to price) for such other work.

4.07 Paragraph 6.13.C of the General Conditions indicates that if an Owner safety program exists, it will be noted in the Supplementary Conditions.

4.08 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, and the other related data identified in the Bidding Documents.

B. visit the Site and become familiar with and satisfy Bidder as to the general, local and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state and local Laws and Regulations that may affect cost, progress, or performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities) that have been identified in Paragraph 4.02 of the Supplementary Conditions as containing reliable “technical data,” and (2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the Supplementary Conditions as containing reliable “technical data;”

E. consider the information known to Bidder; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Bidding Documents; and the Site-related reports and drawings identified in the Bidding Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents; and (3) Bidder’s safety precautions and programs;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times required, and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. promptly give Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

I. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.09 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PREBID CONFERENCE

None.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be directed to Engineer in writing. Interpretations or clarification considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents.

Questions received less than 3 days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security with affixed seal made payable to Owner in an amount of 5% of Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid bond issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the General Conditions. Facsimile, telegraphic, or other electronically transmitted Bid Security or Bid bonds submitted with the Bid will be considered provided that, within 48 hours after the time for receipt of Bids, the original Bid bond form with the original signature and original required attachments are received by Engineer. Attorneys-in-fact who execute the Bid Security or Bid bond on behalf of the Surety shall affix to the bond a certified and current copy of the power of attorney.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 10 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of 7 days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within 15 days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The dates by which the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or equal" items.

11.02 Whenever materials or equipment are specified or described in the Bidding Documents by using the name of one or more Suppliers, the Bid shall be based on providing the materials or equipment of one of the Suppliers named.

11.03 Whenever it is specified or described in the Bidding Documents that a substitute or "or equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement. The procedure for submission of any such application by Contractor and consideration by Engineer is set forth in paragraph 6.05 of the General Conditions and may be supplemented in Division 01 - General Requirements.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require, or if Owner requests, the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within 2 days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualifications for each such Subcontractor, Supplier, individual or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit an acceptable substitute, in which case the apparent Successful Bidder shall submit an acceptable substitute, Bidder's Bid price will be increased (or decreased) by the difference in

cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid form. A Bid price shall be indicated for each Bid item listed therein. In the case of optional alternatives, the words “No Bid”, “No Change”, or “Not Applicable” may be entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president, vice president, or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed, if required by state law, and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be indicated below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be indicated below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be indicated below the signature.

13.06 A Bid by an individual shall indicate the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid form. The official address of the joint venture shall be indicated below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 **The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers, and dates of which shall be filled in on the Bid form.**

13.10 Postal and e-mail addresses and telephone number for communications regarding the Bid shall be indicated.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or Bidder shall covenant in writing to obtain such authority and qualification prior to award of the Contract and attach such covenant to the Bid. Bidder's state contractor license number, if any, for the state in which the Project is located shall also be indicated on the Bid form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 Basis of Bid

- A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all estimated prices will be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

14.03 Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 15 – SUBMITTAL OF BID

15.01. A separate unbound copy of the Bid form and, if required, the Bid bond form are furnished with each set of Bidding Documents. The Bid form is to be completed and submitted with the Bid security.

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement for Bids and shall be enclosed in an opaque, sealed package, plainly marked with the Project title and name and address of the Bidder and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation "BID ENCLOSED".

15.03 Bid forms with facsimile or other electronically transmitted signatures will not be considered.

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BIDS

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If, within 24 hours after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

16.03 No withdrawal of a Bid shall be permitted on account of mistake or any other reason after the expiration of this 24 hour period.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement for Bids and, unless obviously nonresponsive, read aloud publicly. An abstract of the amounts of the Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time or changes in the Work and to negotiate contract terms with the Successful Bidder.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Bid form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner also may consider the operating costs, maintenance considerations, performance data and guarantees of materials and equipment proposed for incorporation in the Work when such data is required to be submitted prior to the Notice of Award.

19.06 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals or entities proposed for those portions of the Work in accordance with the Contract Documents.

19.07 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

19.08 If the Contract is to be awarded, Owner will give Successful Bidder a Notice of Award within **5** days after the day of the Bid opening.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by the required certificates of insurance (and other evidence of insurance requested by Owner).

20.02 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to bonds. When Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by the required bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner issues a Notice of Award to the Successful Bidder, it will be accompanied by the required number of unsigned counterparts of the Agreement bound into the Project Manual with the other Contract Documents which are identified in the Agreement as attached thereto. Within **5** days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within **5** days thereafter, Owner will deliver one fully signed counterpart to Successful Bidder.

ARTICLE 22 – RETAINAGE AND PROGRESS PAYMENTS

23.01 Provisions concerning retainage and progress payments are set forth in the Agreement.

23.02 Retainages and progress payments will be in accordance with State of Michigan Act 524 of the Public Acts of 1980.

ARTICLE 23 – OWNER FURNISHED MATERIAL

24.01 Refer to Division 01 Section "Summary of Work" for Owner furnished materials.

END OF SECTION 00 2113

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SECTION 00 41 43 - PROPOSAL FORM

 Name of Bidding Contractor _____

hereinafter referred to as Contractor, declares familiarity with location of proposed work and conditions under which it must be performed, that Drawing(s) and Documents under "Bid Package Table of Contents" have been carefully examined, are understood and accepted as adequate for the purpose, and agrees to Contract with the **Charter Township of Van Buren**, hereinafter referred to as Owner, to perform everything required to be performed and to furnish all labor, materials, tools, equipment, utility, transportation services and supervision necessary to perform and complete, in a satisfactory manner, all work required in conjunction with above named project, and to accept as full payment thereof, subject to additions and/or deletions required by Contract, the sum of Dollars.

TOTAL BASE BID \$ _____.

ANALYSIS OF BID:

Unit Costs submitted for Contract additions/deletions, inclusive of any maintenance and guarantee period not separately listed. Total must equal Base Bid above. Contractor responsible to verify estimated quantity material. All work to be installed complete, as detailed on Drawing(s), within quote Base Bid.

Quantity	Description and Size	Unit Cost	Total Cost
Lump Sum	Mobilization		\$ _____
Lump Sum	General Conditions (Building permit fees and inspection fees will be paid for by the Township)		\$ _____
Lump Sum	Soil Erosion and Sedimentation Control Measures (SESC permit and inspections fees shall be paid for by the contractor)		\$ _____
Lump Sum	Tree & Native Seeded Area Protection Measures, Complete		\$ _____
Lump Sum	Asphalt Drive Removal, Complete		\$ _____
Lump Sum	Concrete Sidewalk Removal, Complete		\$ _____
Lump Sum	Landscape Removal /Strip Sod, Complete		\$ _____
Lump Sum	Selective Site Demolition, Complete		\$ _____
Lump Sum	Earthwork (incl.- excavation and export), Complete		\$ _____
_____ cy	Imported Sandy Loam Topsoil, (incl. Supply, Install and Shaping), Complete	\$ _____	\$ _____

Quantity	Description and Size	Comments	Unit Cost	Total Cost
Lump Sum	Swing Barrier Gate with Latching Posts		\$ _____	\$ _____
Lump Sum	Parking Striping, Symbols, and Barrier Free Signage		\$ _____	\$ _____
Lump Sum	Bollard Restoration		\$ _____	\$ _____
_____ sy.	Asphalt Drive and Cul-de-sac (include gravel edge restoration), Complete		\$ _____	\$ _____
_____ ea.	Drain-Style Bumper Blocks		\$ _____	\$ _____
_____ sf.	Integral Concrete Walk with Curb		\$ _____	\$ _____
_____ sf.	4" Concrete Paving (incl. trash receptacle pad)		\$ _____	\$ _____
_____ sf.	6" Concrete Paving (at ramp down to future kayak launch, incl. Thickened Edge at termination point), Complete		\$ _____	\$ _____
_____ ff.	Retaining Wall (incl. cap, drain tile, geogrid, & Sleeve-It system to receive fence), Complete		\$ _____	\$ _____
_____ lf.	42" Ht. Fence (at retaining wall), Complete		\$ _____	\$ _____
_____ lf.	Cedar Rail Fence, Complete		\$ _____	\$ _____
_____ lf.	Pipe and Tube Handrails (at ramp), Complete		\$ _____	\$ _____
_____ ea.	Masonry Piers, Complete		\$ _____	\$ _____
_____ lf.	Shovel Cut Bed Edge, Complete		\$ _____	\$ _____
3 ea.	Liriodendron tulipifera, 2.5" cal		\$ _____	\$ _____
17 ea.	Ceanothus americanus, 5 gal.		\$ _____	\$ _____
50 ea.	Diervilla lonicera 'Michigan Sunset', 5 gal.		\$ _____	\$ _____
15 ea.	Juniperus sabina 'Broadmoor', 5 gal.		\$ _____	\$ _____
37 ea.	Rhus aromatica 'Gro-Low', 5 gal.		\$ _____	\$ _____
72 ea.	Schizachyrium scoparium 'Blue Heaven', 1 gal.		\$ _____	\$ _____
30 ea.	Amsonia 'Blue Ice', 1 gal.		\$ _____	\$ _____
50 ea.	Aster oblongifolium 'October Skies', 1 gal.		\$ _____	\$ _____
34 ea.	Geranium 'Rozanne', 1 gal.		\$ _____	\$ _____
120 ea.	Rudbeckia fulgida 'Goldsturm', 1 gal.		\$ _____	\$ _____

_____ sy. Fine Grade and Sodded Lawn	\$ _____	\$ _____
_____ cy. Shredded Hardwood Bark Mulch	\$ _____	\$ _____
_____ cy. Planting Mix	\$ _____	\$ _____
1 ea. Trash Receptacle (Install, surface mount ONLY)	\$ _____	\$ _____
Lump Sum Automatic Irrigation System, Complete		\$ _____
TOTAL BASE BID		\$ _____

UNIT COSTS

Contractor shall submit **installed** unit prices for items of stated below. Prices shall include all material, equipment, labor, profit and overhead required for the complete installation of the work item. The owner reserves the right to increase or decrease the Total Base Bid on the basis of the unit prices stated. The owner reserves the right, prior to the bid award to negotiate with the bidder on any or all unit prices listed in this proposal. Contractor 'mark-up' will not be paid in addition to the provided unit prices.

- 1 cy. Undercutting and removal of unsuitable soils \$ _____/CY
- 1 cy. 21AA Crushed Limestone, Install & Compacted \$ _____/CY

REQUIRED ALTERNATES

Contractor shall submit **installed** prices for items of stated below. Prices shall include all material, equipment, labor, profit and overhead required for the complete installation of the work item. The owner reserves the right to increase or decrease the Total Base Bid on the basis of the alternate prices stated. The owner reserves the right, prior to the bid award to negotiate with the bidder on any or all alternate prices listed in this proposal. Contractor 'mark-up' will not be paid in addition to the provided prices.

- 1. Seeded Lawn in lieu of Sodded Lawn ADD / DEDUCT: \$ _____
- 2. Milling Asphalt in lieu of Removing and Disposing ADD / DEDUCT: \$ _____
- 3. Composite Rail Fence in lieu of Cedar Rail Fence ADD / DEDUCT: \$ _____

VOLUNTARY ALTERNATES

Contractor shall submit **installed** prices for items of stated below. Prices shall include all material, equipment, labor, profit and overhead required for the complete installation of the work item. The owner reserves the right to increase or decrease the Total Base Bid on the basis of the alternate prices stated. The owner reserves the right, prior to the bid award to negotiate with the bidder on any or all alternate prices listed in this proposal. Contractor 'mark-up' will not be paid in addition to the provided prices.

- 1. _____ ADD / DEDUCT: \$ _____
- 2. _____ ADD / DEDUCT: \$ _____

Contractor acknowledges following addenda covering revisions to Drawing(s) or Specifications;
Cost of such revisions has been included in quoted base bid.

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Our subcontractors will be:

Name:	Address:	Specialty:
_____	_____	_____
_____	_____	_____
_____	_____	_____

Bidding Contractor: _____

Complete Address: _____

County: _____ Telephone: (_____) _____

By: _____ Title: _____

Email: _____

Dated this _____ day of _____ 2022

Circle One: Corporation, Partnership, Individual

END OF SECTION 00 4143

SECTION 00 4313 – BID SECURITY FORM

Owner:

Charter Township of Van Buren
46425 Tyler Road
Charter Township of Van Buren, MI 48111

Bid:

Bid Due Date: July 19, 2022 @ 2:00 PM (local time)
Project: Charter Township of Van Buren
French Landing Park Improvements – Phase II

Location: 12090 Haggerty Road
Charter Township of Van Buren, MI.

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid bond to be duly executed by an authorized officer, agent, or representative.

Surety (Principal Place of Business):

Bidder:

Surety's Name of and Corporate Seal*

Bidder's Name and Corporate Seal*

Business Street Address*

Business Street Address*

City, State, Zip *

City, State, Zip *

By: _____
Signature
(Attach Power of Attorney)

By: _____
Signature

By: _____
(Print Name*)

By: _____
(Print Name*)

Attest: _____
Signature

Attest: _____
Signature

Title*

Title*

* Typed or printed in ink.

Bond:

Bond Number: _____

Date (Not later than Bid due date): _____

Penal Sum: _____ \$ _____
(Words) (Figures)

- Note:
- (1) Above addresses are to be used for giving required notice.
 - (2) Any singular reference to Bidder, Surety, Owner or other party shall be considered plural where applicable.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this bond. Payment of the penal

sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this bond shall be Owner's sole and exclusive remedy upon default of Bidder.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by paragraph 5 hereof).

4. Payment under this bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this bond and the Project and including a statement of the amount due.

5. Surety waives notice of and any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety, and in no case later than one year after Bid due date.

7. Any suit or action under this bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses indicated on the face of this bond. Such notices may be sent by personal delivery, commercial courier or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this bond a current and effective Power of Attorney evidencing the authority of the officer, agent or representative who executed this bond on behalf of Surety to execute, seal and deliver such bond and bind the Surety thereby.

10. This bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this bond shall be deemed to be included herein as if set forth at length. If any provision of this bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer or proposal as applicable.

END OF SECTION 00 4313

SECTION 00 5100 – NOTICE OF AWARD

Dated _____, 2022

TO: _____
(Bidder)

ADDRESS: _____

CONTRACT: Charter Township of Van Buren
French Landing Park Improvements - Phase II
12090 Haggerty Road
Charter Township of Van Buren, MI.

You are notified that your Bid dated _____, 2022 for the above Contract has been considered. You are the Successful Bidder and are awarded a Contract for the Charter Township of Van Buren French Landing Park Improvements.

The Contract Price of your Contract is _____ Dollars (\$_____). Two copies of the proposed Contract Documents as identified in the Agreement accompany this Notice of Award.

You must comply with the following conditions precedent within **2** days of the date of this Notice of Award that is by _____, 2022.

1. Deliver to the Owner two fully executed counterparts of the Contract Documents which accompany this Notice of Award, each of which must bear your signature at the designated location.
2. Deliver with the Executed Contract Documents the Contract security bonds as specified in the General Conditions (Paragraph 5.01), and the Supplementary Conditions (Paragraph SC-5.01).
3. Deliver with the Executed Contract Documents the insurance documents as specified in the General Conditions (Article 5) and the Supplementary Conditions (Article SC-5).

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid security forfeited.

Within **2** days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

Charter Township of Van Buren

By: _____
(Authorized Signature)

(Name and Title)

Charter Township of Van Buren
French Landing Park Improvements – Phase II
Project Number V05-221

Notice of Award

Section 00 5100

*Typed or printed in ink
Copy to Landscape Architect

END OF SECTION 00 5100

Charter Township of Van Buren
French Landing Park Improvements – Phase II
Project Number V05-221

Notice of Award

Section 00 5100

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SECTION 00 5200 – AGREEMENT FORM

THIS AGREEMENT is by and between the Charter Township of Van Buren (“Owner”) and _____.

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows: Charter Township of Van Buren French Landing Park Improvements

ARTICLE 2 – THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows: Charter Township of Van Buren French Landing Park Improvements consisting of: the soil erosion control, demolition, field engineering, earthwork, concrete paving, landscape, irrigation and miscellaneous coordination with owner provided vendors.

ARTICLE 3 – ENGINEER

3.01 The Project has been designed by Russell Design, Inc. Northville, Michigan (“Engineer” / “Landscape Architect”) which is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIME

4.01 TIME OF THE ESSENCE

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 DATES FOR SUBSTANTIAL COMPLETION AND FINAL PAYMENT

A. The Work will be substantially completed on or before September 16, 2022 and completed and ready for final payment in accordance with Paragraph 14.07 of the General Conditions on or before September 30, 2022.

4.03 LIQUIDATED DAMAGES

A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner Eight Hundred Dollars (\$800.00) for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete.

B. After Substantial Completion, if Contractor shall neglect, refuse or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner Eight Hundred Dollars (\$800.00) for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

C. Liquidated damages for failure to meet the specified Substantial Completion date and for failure to meet the specified Final Completion date will not be assessed simultaneously.

ARTICLE 5 – CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents, in current funds, at the unit prices stated in Contractor's Bid.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 SUBMITTAL AND PROCESSING OF PAYMENTS

A. A. Payments and retainage of payments shall be in accordance with State of Michigan Act No. 524 of the Public Acts of 1980. Contractor shall submit applications for payment in accordance with Article 14 of the General Conditions. The person representing Contractor who shall submit Application for Payment will be _____ . The person to whom Application for Payment are to be submitted is Russell Design, Inc. Attention: Marc R. Russell.

Applications for Payment will be processed by Landscape Architect/Engineer as provided in the General Conditions.

6.02 PROGRESS PAYMENTS; RETAINAGE

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment during performance of the Work as provided in Paragraphs 6.02. A.1 and 6.02.A.2 below. All such payments will be based on unit prices and number of units completed.

1. Prior to Substantial Completion, progress payments will be in an amount equal to: 90% of the Work completed and 90% of materials and equipment not incorporated in the Work but delivered, suitably stored and accompanied by documentation satisfactory to Owner as provided in Paragraph 14.02 of the General Conditions less the aggregate of payments previously made and less such amounts as Landscape Architect/Engineer may determine, or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions, except that Owner will retain a portion of each progress payment limited to:

a. Not more than 10% of the dollar value of the Work completed until 90% of the Work has been completed as determined by Engineer.

b. After the Work has been 90% completed as determined by Landscape Architect/Engineer, additional retainage will not be withheld unless Owner determines that Contractor is not making satisfactory progress, or for other specific cause relating to Contractor's performance under the Contract. If Owner so determines, Owner may retain not more than 10% of the dollar value of the Work more than 90% completed.

2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95% of the Contract Price, less such amounts as Landscape Architect/Engineer shall determine, or Owner may withhold, in accordance with Paragraph 14.02.B.5 of the General Conditions.

3. Owner may deduct from progress payments amounts which are due to Owner from Contractor in accordance with the Contract Documents.

4. After Substantial Completion, Owner may, at Owner's sole discretion, pay an amount sufficient to increase total payments to Contractor to more than 95% of the Contract Price if Owner has received consent of surety in a form acceptable to Owner.

5. Progress payments shall not be due until 15 days after Owner has received the funds with which to make the progress payment from a department or agency of the federal or state government, if any funds are to come from either of these sources.

B. The retained funds will not be commingled with other funds of Owner and will be deposited in an interest bearing account in a regulated financial institution in this state wherein all such retained funds are kept by Owner which will account for both retainage and interest on each construction contract separately.

C. Owner is not required to deposit retained funds in an interest bearing account if the retained funds are to be provided under a state or federal grant and the retained funds have not been paid to Owner.

D. Owner, at any time after 95% of work under the contract has been completed as determined by Landscape Architect/Engineer and at the request of Contractor, will release the retainage to Contractor only if Contractor provides to Owner an irrevocable letter of credit in the amount of the retainage plus interest, issued by a bank authorized to do business in this state, containing terms mutually acceptable to Contractor and Owner.

E. Unresolved disputes between Owner and Contractor regarding retained funds and interest on retained funds shall be submitted to an agent in accordance with the dispute resolution process described in Section 4 of State of Michigan Act 524 of P.A. of 1980.

6.03 FINAL PAYMENT

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 – INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 1% per month.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Contractor has carefully studied all:

(1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities), if any, that have been identified Paragraph 4.02 of the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions as containing reliable "technical data," and

(2) reports and drawings of Hazardous Environmental Conditions, if any, at the Site that have been identified in Paragraph 4.06 of the Supplementary Conditions as provided in paragraph 4.06 of the General Conditions as containing reliable "technical data."

E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on

(1) the cost, progress, and performance of the Work;

(2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and

(3) Contractor's safety precautions and programs.

F. based on the information and observations referred to in Paragraph 8.01.E above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has given Landscape Architect/Engineer written notice of all conflicts, errors, ambiguities or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 9 – CONTRACT DOCUMENTS

9.01 CONTENTS

- A. The Contract Documents consist of the following:
1. Contractor's Bid dated July 19, 2022
 2. Addenda _____
 3. Notice of Award.
 4. This Agreement.
 5. Notice to Proceed
 6. Performance Bond.
 7. Payment Bond.
 8. General Conditions.
 9. Supplementary Conditions.
 10. Specifications as listed in the table of contents of the Project Manual.
 11. Drawings, consisting of sheets as listed on the cover sheet with each sheet bearing the following general title: Charter Township of Van Buren French Landing Park Improvements-Phase II and dated June 21, 2022 Issued for Bids.
 12. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Work Change Directives;
 - b. Change Orders.
- B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 9.
- D. The Contract Documents may only be amended, modified or supplemented as provided in Paragraph 3.04 of the General Conditions.

ARTICLE 10 – MISCELLANEOUS

10.01 TERMS

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

10.02 ASSIGNMENT OF CONTRACT

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 SUCCESSORS AND ASSIGNS

A. Owner and Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto, its partners, successors, assigns and legal representatives in respect to all covenants, agreements and obligations contained in the Contract Documents.

10.04 SEVERABILITY

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

10.05 CONTRACTOR'S CERTIFICATIONS

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 10.05:
- a. "corrupt practice" means the offering, giving, receiving, or soliciting of anything of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - (1) "fraudulent practice" means an intentional misrepresentation of facts made:
 - (a) to influence the bidding process or the execution of the Contract to the detriment of Owner,
 - (b) to establish Bid or Contract prices at artificial non-competitive levels, or
 - (c) to deprive Owner of the benefits of free and open competition;
 - (2) "collusive practice" means a scheme or arrangement between two or more Bidders, with or without the knowledge of Owner, a purpose of which to establish Bid prices at artificial non-competitive levels; and
 - (4) "coercive practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

10.06 OTHER PROVISIONS

- A. Not applicable

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner, Contractor and Engineer. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

Contractor:
PART 1 - _____
Name of Contractor*

Owner:
Charter Township of Van Buren

By: _____
Signature

By: _____
Signature

(Name and Title of Signatory*)

(Name and Title of Signatory*)

Attest: _____

Attest: _____

(Name and Title of Signatory*)

(Name and Title of Signatory*)

Signed on: _____, 20__
(Date*)

Signed on: _____, 20__
(Effective Date of Agreement*)

Address for giving notices:

Address for giving notices:

(Street*)

(Street*)

(City, State and Zip*)

(City, State and Zip*)

License No. _____ (Where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

Agent for service of process: _____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Designated Representative:

Designated Representative:

(Name*)

(Name*)

(Title*)

(Title*)

(Street*)

(Street*)

(City, State and Zip*)

(City, State and Zip*)

(Telephone Number*)

(Telephone Number*)

(Facsimile*)

(Facsimile*)

Corporate Seal - if required by State Law

Corporate Seal - if required by State Law

*Typed or printed in ink.

END OF SECTION 00 5200

SECTION 00 6114 – PERFORMANCE BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

Contractor (Name and Address):

Surety (Name and Address of Principal Place of Business):

Owner: Charter Township of Van Buren
46425 Tyler Road
Charter Township of Van Buren, MI 48111

CONTRACT

Date (Date of Notice of Award): _____

Amount: _____

Description: Charter Township of Van Buren
French Landing Park Improvements - Phase II
12090 Haggerty Road
Charter Township of Van Buren, MI.

BOND

Bond Number: _____

Date (Not earlier than Contract Date): _____

Amount: _____

Modifications to this Bond form: _____

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

Contractor AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Michigan. Attach Power of Attorney for those signatures executing for Surety, certifying authority to bind the Surety as of the date of the Bond:

1. Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, the Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in paragraph 3.1.
3. If there is no Owner Default, the Surety's obligation under this Bond shall arise after:
 - 3.1. Owner has notified Contractor and Surety at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
 - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in paragraph 3.1; and
 - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
 - 3.3.1. Surety in accordance with the terms of the Contract; or
 - 3.3.2. Another contractor selected pursuant to paragraph 4.3 to perform the Contract.
4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
 - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
 - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
 - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
 - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor, and with reasonable promptness under the circumstances:
 - 4.4.1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
 - 4.4.2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Subparagraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, the Surety is obligated without duplication for:

6.1. The responsibilities of Contractor for correction of defective Work and completion of the Contract;

6.2. Additional legal, design professional and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 4; and

6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators or successors.

8. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within 2 years after Contractor Default or within 2 years after Contractor ceased working or within 2 years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10. Notice to Surety, Owner or Contractor shall be mailed or delivered to the address indicated on the signature page.

11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

12. Definitions:

12.1. Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

12.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

12.3. Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.

12.4. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

END OF SECTION 00 6114

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SECTION 00 6115 – PAYMENT BOND FORM

Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

Contractor (Name and Address):

Surety (Name and Address of Principal Place of Business):

Owner: Charter Township of Van Buren
46425 Tyler Road
Charter Township of Van Buren, MI 48111

CONTRACT

Date (Date of Notice of Award): _____
Amount: _____

Description: Charter Township of Van Buren
French Landing Park Improvements - Phase II
12090 Haggerty Road
Charter Township of Van Buren, MI.

BOND

Bond Number: _____
Date (Not earlier than Contract Date): _____
Amount: _____
Modifications to this Bond Form: _____

Surety and Contractor, intending to be legally bound hereby, subject to the following terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

Contractor AS PRINCIPAL

SURETY

Contractor's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____
Signature

Attest: _____
Signature

Title

Title

IMPORTANT: Surety companies executing Bonds must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in Michigan. Attach Power of Attorney for those signatures executing for Surety, certifying authority to bind Surety as of the date of the Bond.

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to Owner to pay for labor, materials and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
 - 2.1. promptly makes payment, directly or indirectly, for all sums due Claimants, and
 - 2.2. defends, indemnifies and holds harmless Owner from all claims, demands, liens or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
 - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
 - 4.2. Claimants who do not have a direct contract with Contractor:
 - 4.2.1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and
 - 4.2.2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
 - 4.2.3. Not having been paid within the above 30 days, have sent a written notice to Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice required by Paragraph 4 is given by Owner to Contractor or to Surety,, that is sufficient compliance.
6. Reserved.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant give the notice required by paragraph 4.1 or paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice to Surety, Owner or Contractor shall be mailed or delivered to the addresses indicated on the signature page. Actual receipt of notice by Surety, Owner or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address indicated on the signature page.

13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.

14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. DEFINITIONS:

15.1. Claimant: An individual or entity having a direct contract with Contractor or with a first-tier Subcontractor of Contractor, to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.

15.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract, or to perform and complete or comply with the other terms thereof.

END OF SECTION 00 6115

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This document has important legal consequences; consultation with an attorney is encouraged with respect to its use or modification. This document should be adapted to the particular circumstances of the contemplated Project and the controlling Laws and Regulations.

STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT

Prepared by

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and

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Endorsed by



CONSTRUCTION SPECIFICATIONS INSTITUTE

These General Conditions have been prepared for use with the Suggested Forms of Agreement Between Owner and Contractor (EJCDC C-520 or C-525, 2007 Editions). Their provisions are interrelated and a change in one may necessitate a change in the other. Comments concerning their usage are contained in the Narrative Guide to the EJCDC Construction Documents (EJCDC C-001, 2007 Edition). For guidance in the preparation of Supplementary Conditions, see Guide to the Preparation of Supplementary Conditions (EJCDC C-800, 2007 Edition).

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CONSTRUCTION CONTRACT**

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ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.
1. *Addenda*—Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
 2. *Agreement*—The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.
 3. *Application for Payment*—The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
 4. *Asbestos*—Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
 5. *Bid*—The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
 6. *Bidder*—The individual or entity who submits a Bid directly to Owner.
 7. *Bidding Documents*—The Bidding Requirements and the proposed Contract Documents (including all Addenda).
 8. *Bidding Requirements*—The advertisement or invitation to bid, Instructions to Bidders, Bid security of acceptable form, if any, and the Bid Form with any supplements.
 9. *Change Order*—A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 10. *Claim*—A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
 11. *Contract*—The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*—Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
13. *Contract Price*—The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
14. *Contract Times*—The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any; (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
15. *Contractor*—The individual or entity with whom Owner has entered into the Agreement.
16. *Cost of the Work*—See Paragraph 11.01 for definition.
17. *Drawings*—That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
18. *Effective Date of the Agreement*—The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
19. *Engineer*—The individual or entity named as such in the Agreement.
20. *Field Order*—A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. *General Requirements*—Sections of Division 1 of the Specifications.
22. *Hazardous Environmental Condition*—The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto.
23. *Hazardous Waste*—The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. *Laws and Regulations; Laws or Regulations*—Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. *Liens*—Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. *Milestone*—A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*—The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.
28. *Notice to Proceed*—A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. *Owner*—The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. *PCBs*—Polychlorinated biphenyls.
31. *Petroleum*—Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. *Progress Schedule*—A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. *Project*—The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. *Project Manual*—The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. *Radioactive Material*—Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. *Resident Project Representative*—The authorized representative of Engineer who may be assigned to the Site or any part thereof.
37. *Samples*—Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
38. *Schedule of Submittals*—A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.
39. *Schedule of Values*—A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

40. *Shop Drawings*—All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
41. *Site*—Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.
42. *Specifications*—That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
43. *Subcontractor*—An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
44. *Substantial Completion*—The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
45. *Successful Bidder*—The Bidder submitting a responsive Bid to whom Owner makes an award.
46. *Supplementary Conditions*—That part of the Contract Documents which amends or supplements these General Conditions.
47. *Supplier*—A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or Subcontractor.
48. *Underground Facilities*—All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
49. *Unit Price Work*—Work to be paid for on the basis of unit prices.
50. *Work*—The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
51. *Work Change Directive*—A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an

addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The words and terms discussed in Paragraph 1.02.B through F are not defined but, when used in the Bidding Requirements or Contract Documents, have the indicated meaning.

B. *Intent of Certain Terms or Adjectives:*

1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered,” “as directed” or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action, or determination will be solely to evaluate, in general, the Work for compliance with the information in the Contract Documents and with the design concept of the Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work, or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day:*

1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective:*

1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
 - a. does not conform to the Contract Documents; or
 - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents; or
 - c. has been damaged prior to Engineer’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

E. *Furnish, Install, Perform, Provide:*

1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
 2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
 3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.
 4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases that have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 – PRELIMINARY MATTERS

2.01 Delivery of Bonds and Evidence of Insurance

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 Copies of Documents

- A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 Commencement of Contract Times; Notice to Proceed

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

- A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review:
 - 1. a preliminary Progress Schedule indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
 - 2. a preliminary Schedule of Submittals; and
 - 3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference; Designation of Authorized Representatives*

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.
- B. At this conference Owner and Contractor each shall designate, in writing, a specific individual to act as its authorized representative with respect to the services and responsibilities under the Contract. Such individuals shall have the authority to transmit instructions, receive information, render decisions relative to the Contract, and otherwise act on behalf of each respective party.

2.07 *Initial Acceptance of Schedules*

- A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.
 - 1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of

the Work, nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.
3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that reasonably may be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the indicated result will be provided whether or not specifically called for, at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

- A. Standards, Specifications, Codes, Laws, and Regulations
 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.
 2. No provision of any such standard, specification, manual, or code, or any instruction of a Supplier, shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees, from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. *Reporting Discrepancies:*

1. *Contractor's Review of Contract Documents Before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor discovers, or has actual knowledge of, and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents, or between the Contract Documents and (a) any applicable Law or Regulation, (b) any standard, specification, manual, or code, or (c) any instruction of any Supplier, then Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor had actual knowledge thereof.

B. *Resolving Discrepancies:*

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
 - a. the provisions of any standard, specification, manual, or code, or the instruction of any Supplier (whether or not specifically incorporated by reference in the Contract Documents); or
 - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
 1. A Field Order;
 2. Engineer's approval of a Shop Drawing or Sample (subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

- A. Contractor and any Subcontractor or Supplier shall not:
1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or its consultants, including electronic media editions; or
 2. reuse any such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaptation by Engineer.
- B. The prohibitions of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

- A. Unless otherwise stated in the Supplementary Conditions, the data furnished by Owner or Engineer to Contractor, or by Contractor to Owner or Engineer, that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the

Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

- 1. those reports known to Owner of explorations and tests of subsurface conditions at or contiguous to the Site; and
- 2. those drawings known to Owner of physical conditions relating to existing surface or subsurface structures at the Site (except Underground Facilities).

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

- 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
- 2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
- 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition that is uncovered or revealed either:

- 1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
- 2. is of such a nature as to require a change in the Contract Documents; or
- 3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

- B. *Engineer's Review:* After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. *Possible Price and Times Adjustments:*

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:
 - a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
 - b. with respect to Work that is paid for on a unit price basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
 - a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
 - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
 - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, neither Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data provided by others; and
2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
 - a. reviewing and checking all such information and data;
 - b. locating all Underground Facilities shown or indicated in the Contract Documents;
 - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction; and
 - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated:*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

- A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

- A. *Reports and Drawings:* The Supplementary Conditions identify those reports and drawings known to Owner relating to Hazardous Environmental Conditions that have been identified at the Site.
- B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:
 - 1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or
 - 2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or
 - 3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.
- C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.
- D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any. Promptly after consulting with Engineer, Owner shall take such actions as are necessary to

permit Owner to timely obtain required permits and provide Contractor the written notice required by Paragraph 4.06.E.

- E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered written notice to Contractor: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.
- F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.
- G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.
- I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 – BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent or attorney-in-fact must be accompanied by a certified copy of that individual's authority to bind the surety. The evidence of authority shall show that it is effective on the date the agent or attorney-in-fact signed each bond.
- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

- A. Contractor shall deliver to Owner, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured and loss payee identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

- C. Failure of Owner to demand such certificates or other evidence of Contractor's full compliance with these insurance requirements or failure of Owner to identify a deficiency in compliance from the evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. Owner does not represent that insurance coverage and limits established in this Contract necessarily will be adequate to protect Contractor.
- E. The insurance and insurance limits required herein shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

5.04 *Contractor's Insurance*

- A. Contractor shall purchase and maintain such insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
 - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
 - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
 - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;
 - 4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
 - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
 - b. by any other person for any other reason;
 - 5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
 - 6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
 - 1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, be written on an occurrence basis, include as additional insureds (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, members, partners,

employees, agents, consultants, and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;
3. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
4. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
5. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
6. include completed operations coverage:
 - a. Such insurance shall remain in effect for two years after final payment.
 - b. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

- A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:
 1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of

them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee;

2. be written on a Builder's Risk "all-risk" policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, falsework, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required by the Supplementary Conditions.
 3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
 4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;
 5. allow for partial utilization of the Work by Owner;
 6. include testing and startup; and
 7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other loss payee to whom a certificate of insurance has been issued.
- B. Owner shall purchase and maintain such equipment breakdown insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as a loss payee.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with this Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other loss payee to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

- E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under this Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or loss payees thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors and Engineer, and all other individuals or entities identified in the Supplementary Conditions as loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them for:
1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and
 2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.
- C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the loss payees, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.
- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 – CONTRACTOR’S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

- A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances.

6.02 *Labor; Working Hours*

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner’s written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.
1. "*Or-Equal*" Items: If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
 - a. in the exercise of reasonable judgment Engineer determines that:
 - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
 - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole; and
 - 3) it has a proven record of performance and availability of responsive service.
 - b. Contractor certifies that, if approved and incorporated into the Work:
 - 1) there will be no increase in cost to the Owner or increase in Contract Times; and
 - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. *Substitute Items:*

- a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
- b. Contractor shall submit sufficient information as provided below to allow Engineer to determine if the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.
- c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented by the General Requirements, and as Engineer may decide is appropriate under the circumstances.
- d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
 - 1) shall certify that the proposed substitute item will:
 - a) perform adequately the functions and achieve the results called for by the general design,
 - b) be similar in substance to that specified, and
 - c) be suited to the same use as that specified;
 - 2) will state:
 - a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time,
 - b) whether use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item, and
 - c) whether incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
 - 3) will identify:
 - a) all variations of the proposed substitute item from that specified, and
 - b) available engineering, sales, maintenance, repair, and replacement services; and
 - 4) shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change.

- B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.
- C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by a Change Order in the case of a substitute and an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.
- D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. *Engineer's Cost Reimbursement:* Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. *Contractor's Expense:* Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or

entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

- C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity; nor
 2. shall create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as a loss payee on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or loss payees (and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if, to the actual knowledge of Owner or Engineer, its

use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

- B. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, and its officers, directors, members, partners, employees, agents, consultants, and subcontractors from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals, and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device specified in the Contract Documents, but not identified as being subject to payment of any license fee or royalty to others required by patent rights or copyrights.
- C. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

- A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner

and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

6.10 *Taxes*

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. *Limitation on Use of Site and Other Areas:*

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Such responsibility does not relieve Subcontractors of their responsibility for the safety of persons or property in the performance of their work, nor for compliance with applicable safety Laws and Regulations. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
 - 1. all persons on the Site or who may be affected by the Work;
 - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
 - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. Contractor shall comply with the applicable requirements of Owner's safety programs, if any. The Supplementary Conditions identify any Owner's safety programs that are applicable to the Work.
- D. Contractor shall inform Owner and Engineer of the specific requirements of Contractor's safety program with which Owner's and Engineer's employees and representatives must comply while at the Site.
- E. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Engineer or anyone employed by any of them, or anyone for whose acts

any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

- F. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

6.16 *Emergencies*

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

6.17 *Shop Drawings and Samples*

- A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the accepted Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. *Shop Drawings:*

- a. Submit number of copies specified in the General Requirements.
- b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:*

- a. Submit number of Samples specified in the Specifications.

- b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. *Submittal Procedures:*

1. Before submitting each Shop Drawing or Sample, Contractor shall have:
 - a. reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents;
 - b. determined and verified all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
 - c. determined and verified the suitability of all materials offered with respect to the indicated application, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work; and
 - d. determined and verified all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto.
2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Engineer specific written notice of any variations that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawings or Sample submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review:*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the

Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures:*

1. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

6.18 *Continuing the Work*

- A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
 1. observations by Engineer;
 2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;
4. use or occupancy of the Work or any part thereof by Owner;
5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;
6. any inspection, test, or approval by others; or
7. any correction of defective Work by Owner.

6.20 *Indemnification*

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .
- B. In any and all claims against Owner or Engineer or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, members, partners, employees, agents, consultants and subcontractors arising out of:
 1. the preparation or approval of, or the failure to prepare or approve maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.
- C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 – OTHER WORK AT THE SITE

7.01 *Related Work at Site*

- A. Owner may perform other work related to the Project at the Site with Owner's employees, or through other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:
 - 1. written notice thereof will be given to Contractor prior to starting any such other work; and
 - 2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Owner, if Owner is performing other work with Owner's employees, proper and safe

access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:
 - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
 - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
 - 3. the extent of such authority and responsibilities will be provided.
- B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's wrongful actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor under direct contract to Owner for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's wrongful action or inactions.

ARTICLE 8 – OWNER’S RESPONSIBILITIES

8.01 *Communications to Contractor*

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

- A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

- A. Owner’s duties with respect to providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner’s identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions relating to existing surface or subsurface structures at the Site.

8.06 *Insurance*

- A. Owner’s responsibilities, if any, with respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

- A. Owner’s responsibility with respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

8.09 *Limitations on Owner’s Responsibilities*

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor’s means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws

and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

8.10 *Undisclosed Hazardous Environmental Condition*

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

- A. Upon request of Contractor, Owner shall furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents.

8.12 *Compliance with Safety Program*

- A. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed pursuant to Paragraph 6.13.D.

ARTICLE 9 – ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

- A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents.

9.02 *Visits to Site*

- A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.
- B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work, Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

- A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

- A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

- A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

9.06 *Shop Drawings, Change Orders and Payments*

- A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.
- C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.
- D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

- A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations

on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

- A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question.
- B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believes that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

- A. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract Documents nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.
- D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of,

and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with, the Contract Documents.

- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to the Resident Project Representative, if any, and assistants, if any.

9.10 *Compliance with Safety Program*

- A. While at the Site, Engineer's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Engineer has been informed pursuant to Paragraph 6.13.D.

ARTICLE 10 – CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.D.

10.03 *Execution of Change Orders*

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Engineer covering:
 - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
 - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
 - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of

executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

- A. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

10.05 *Claims*

- A. *Engineer's Decision Required:* All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. *Notice:* Written notice stating the general nature of each Claim shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Times shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).
- C. *Engineer's Action:* Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
 - 1. deny the Claim in whole or in part;
 - 2. approve the Claim; or
 - 3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

- E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

- A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall not include any of the costs itemized in Paragraph 11.01.B, and shall include only the following items:
 - 1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time on the Work. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
 - 2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
 - 3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
5. Supplemental costs including the following:
 - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
 - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
 - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.
 - d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, as imposed by Laws and Regulations.
 - e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
 - f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
 - g. The cost of utilities, fuel, and sanitary facilities at the Site.
 - h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, express and courier services, and similar petty cash items in connection with the Work.
 - i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.
 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A.
- C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 Allowances

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.
- B. *Cash Allowances:*
1. Contractor agrees that:
 - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
 - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in

the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. *Contingency Allowance:*

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
2. there is no corresponding adjustment with respect to any other item of Work; and
3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
 2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
 3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. *Contractor's Fee*: The Contractor's fee for overhead and profit shall be determined as follows:
1. a mutually acceptable fixed fee; or
 2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
 - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
 - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
 - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraphs 12.01.C.2.a and 12.01.C.2.b is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
 - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;
 - e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
 - f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

12.02 *Change of Contract Times*

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Engineer, and their officers, directors, members, partners, employees, agents, consultants, or subcontractors shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 – TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 Notice of Defects

- A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. Defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 Access to Work

- A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's safety procedures and programs so that they may comply therewith as applicable.

13.03 Tests and Inspections

- A. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:
 - 1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;
 - 2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in Paragraph 13.04.C; and
 - 3. as otherwise specifically provided in the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

- A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.
- B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

- A. Promptly after receipt of written notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers,

architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:
1. repair such defective land or areas; or
 2. correct such defective Work; or
 3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
 4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for, or a waiver of, the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and for the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

- A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work, or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct, or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 Schedule of Values

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 Progress Payments

A. Applications for Payments:

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.
2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. Review of Applications:

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations of the executed Work as an experienced and qualified design professional, and on Engineer's

review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

- a. the Work has progressed to the point indicated;
 - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, the results of any subsequent tests called for in the Contract Documents, a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and any other qualifications stated in the recommendation); and
 - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.
3. By recommending any such payment Engineer will not thereby be deemed to have represented that:
- a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or
 - b. there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.
4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:
- a. to supervise, direct, or control the Work, or
 - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
 - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
 - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
 - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

- a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
- b. the Contract Price has been reduced by Change Orders;
- c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
- d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due:*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment:*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:
 - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
 - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;
 - c. there are other items entitling Owner to a set-off against the amount recommended; or
 - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor remedies the reasons for such action.
3. Upon a subsequent determination that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1 and subject to interest as provided in the Agreement.

14.03 *Contractor's Warranty of Title*

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Engineer shall make an inspection of the Work to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefor.
- C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will, within 14 days after submission of the tentative certificate to Owner, notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will, within said 14 days, execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.
- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to remove its property and complete or correct items on the tentative list.

14.05 *Partial Utilization*

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions:

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor, Owner, and Engineer will follow the procedures of Paragraph 14.04.A through D for that part of the Work.
2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.
3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. *Application for Payment:*

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.
2. The final Application for Payment shall be accompanied (except as previously delivered) by:
 - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.6;
 - b. consent of the surety, if any, to final payment;
 - c. a list of all Claims against Owner that Contractor believes are unsettled; and

- d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner might in any way be responsible, or which might in any way result in liens or other burdens on Owner's property, have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

B. Engineer's Review of Application and Acceptance:

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due:

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and will be paid by Owner to Contractor.

14.08 Final Completion Delayed

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

- A. The making and acceptance of final payment will constitute:
1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

- A. The occurrence of any one or more of the following events will justify termination for cause:
1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
 3. Contractor's repeated disregard of the authority of Engineer; or
 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:
1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion);

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere; and
 3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph, Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B and 15.02.C.

15.03 *Owner May Terminate For Convenience*

- A. Upon seven days written notice to Contractor and Engineer, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
 2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
 3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other

dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

ARTICLE 16 – DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions; or

2. agrees with the other party to submit the Claim to another dispute resolution process; or
3. gives written notice to the other party of the intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 – MISCELLANEOUS

17.01 Giving Notice

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended; or
 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 Computation of Times

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 Cumulative Remedies

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.04 Survival of Obligations

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Controlling Law

- A. This Contract is to be governed by the law of the state in which the Project is located.

17.06 Headings

- A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

END OF SECTION 00 72 00

SECTION 00 7300 – SUPPLEMENTARY CONDITIONS

These Supplementary Conditions amend or supplement the General Conditions (Standard General Conditions of the Construction Contract). All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions have the meanings stated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings stated below, which are applicable to both the singular and plural thereof.

The address system used in these Supplementary Conditions is the same as the address system in the General conditions, with the Prefix “SC” added thereto.

ARTICLE 1 – DEFINITIONS AND TERMINOLOGY

SC-1.01 Defined Terms

Add the following language to the first sentence of Paragraph 1.01.A:

; except where the terms “Architect,” “Landscape Architect,” “Engineer,” and “Contractor” are preceded by an adjective, the term shall then be understood to refer to the entity described by the combination of the two words.

SC-1.01.A.19 Engineer

Delete Paragraph 1.01.A.19 in its entirety and insert the following in its place:

19. Engineer – The individual or entity named as Engineer or Landscape Architect in the Agreement.

SC-1.01.A.44 Substantial Completion

Add the following paragraph immediately after Paragraph 1.01.A.44:

Substantial Completion shall specifically include the following items:

- a. Sitework:
 - (1) Concrete paving, ramp, and railings
 - (2) Asphalt Paving
 - (3) Segmental retaining Wall and railing
 - (4) Masonry Piers and Fencing
 - (5) Site furniture received assembled and installed (owner will provide)
 - (6) Plant Material Installation and Sodding/mulching completed.

Add the following paragraphs immediately after Paragraph 1.01.A.51:

52. Landscape Architect/Architect – The individual or entity named as Architect or Engineer in the Agreement.
53. General Contractor – The Contractor as defined in Paragraph 1.01. A.15.
54. Manufacturer – An individual or entity that manufactures or fabricates Products.
55. Products – Systems, materials, manufactured units, equipment, components, and accessories used in the Work.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.01 Delivery of Bonds and Evidence of Insurance

Delete Paragraph 2.01.A in its entirety and insert the following in its place:

- A. When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner, with copies to each additional insured identified herein, certificates of insurance (and other evidence of insurance

which Owner or any additional insured may reasonably request) which Contractor is required to purchase and maintain in accordance with Article 5.

SC-2.01.B Evidence of Insurance

Delete Paragraph 2.01.B in its entirety.

Add the following new paragraph after Paragraph 2.01 A.:

B. When Contractor delivers the executed Agreements to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish in accordance with Article 5. Facsimile, telegraphic, oral, or other electronically transmitted bonds will not be considered. Attorneys-in-fact who execute the bonds on behalf of the Surety shall affix to each bond a certified and current copy of the power of attorney.

C. Before commencement of Contract Time, Owner shall deliver to Contractor, with copies to each additional insured identified herein, certificates of insurance (and other evidence of insurance which Contractor or any additional insured may reasonably request) which Owner is required to purchase and maintain in accordance with Article 5. Contractor shall not start any work at the Site prior to Owner delivering the required certificates and other evidence of insurance.

SC-2.02 Copies of Documents

Delete Paragraph 2.02.A in its entirety and insert the following in its place:

A. Owner shall furnish to Contractor up to 2 printed or hard copies of the Drawings and Project Manual and one set in electronic format. Additional copies will be furnished upon request at the cost of preparation, reproduction and shipping.

ARTICLE 3 – CONTRACT DOCUMENTS : INTENT, AMENDING, REUSE

SC-3.04 Amending and Supplementing Contract Documents

Add the following new paragraph immediately after Paragraph 3.04.B.

B. Owner shall be entitled to deduct from the Contract Price amounts paid to Engineer for Engineer to evaluate and respond to Contractor's requests for information, where such information was available to Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

SC-3.06 Electronic Data

Delete paragraph A. and insert the following in its place:

A. Contractor and Engineer shall establish the necessary protocols governing the transmission of electronic data, if any. Hard copies of data or documents in Engineer's files used to create electronic versions shall govern over any electronic copies. When hard copies do not exist, the electronic version residing on Landscape Architect's/Engineer's computer network or files shall govern.

ARTICLE 4 – AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS.

SC-4.02 Subsurface and Physical Conditions

Add the following new paragraphs immediately after Paragraph 4.02.B:

- B. The following reports of explorations and tests of subsurface conditions at or contiguous to the Site are known to Owner:
1. Report dated June 22, 2020, prepared by G2 Consulting Group entitled: Report on Geotechnical Investigation French Landing Park Improvements, consisting of 23 pages. The "technical data" contained in such report upon which Contractor may rely is the soil boring logs at the locations and for the conditions at the time the soil borings were taken. This report has been included in the Section 00 31 32 entitled Geotechnical Data.

- C. The following drawings of physical conditions relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) are known to Owner:
1. Drawings dated June 21, 2022, prepared by Russell Design, Inc. (Landscape Architect) entitled: French Landing Park Improvements - Phase II consisting of the "technical data" contained in such drawings upon which Contractor may rely is the general concept for site improvements, and information indicated in such drawings, but not the exact locations, sizes, and materials. These drawings have been attached to the Bidding Documents.

ARTICLE 5 – BONDS AND INSURANCE

SC-5.02 Licensed Sureties and Insurers

Add the following new paragraph immediately after Paragraph 5.02.A:

- D. All bonds and insurance required by the Contract Documents to be purchased and maintained by Contractor shall be obtained from surety or insurance companies that are authorized to transact business in Michigan and are classified at not lower than the following:
1. Best's Key Rating Guide, current edition:
 - a. Rating Classification: A-.
 - b. Financial Size Category: Class V.

SC-5.03 Certificates of Insurance

Delete Paragraph 5.03 in its entirety.

SC-5.04 Contractor's Insurance

Amend the end of Paragraph 5.04.A.5 to delete the last word, and add the following language in its place:

Including claims for damages resulting from pollution; and

Add the following to the end of Paragraph 5.04.B.1:

Additional insureds under this Paragraph shall include the following:

- a. Charter Township of Van Buren, its elected officials, employees, officers, agents, servants, members of boards and commissions, and
- b. Russell Design, Inc.
- c. G2 Consulting Group, LLC

Delete Paragraph 5.04.B.5 in its entirety and insert the following in its place:

5. remain in effect at least until the end of the correction period and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

Add the following new paragraphs immediately after Paragraph 5.04.B.6:

7. Not be written on a claims-made basis;

8. Be issued by insurers who endorse the policies to reflect that, in the event of payment of any loss or damages, subrogation rights under these Contract Documents will be waived by the insurer with respect to claims against Owner or Engineer.

Add the following new paragraph immediately after Paragraph 5.04.B:

E. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:

F.

1. Workers' Compensation, and related coverage under Paragraphs 5.04.A.1 and A.2 of the General Conditions:

a. State:	Statutory
b. Applicable Federal (e.g., Longshoreman's):	Statutory
c. Employer's Liability:	\$500,000

1. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions, which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody, and control of Contractor:

a. General Aggregate	\$3,000,000
b. Products-Completed Operations Aggregate	\$2,000,000
c. Personal and Advertising Injury	\$1,000,000
d. Each Occurrence (Bodily Injury and Property Damage)	\$1,000,000
e. Fire Damage (any one fire)	\$300,000
f. Medical Expense (any one Person)	\$10,000
g. Property Damage liability insurance shall provide Explosion, Collapse and Underground coverages where applicable. Certificates shall show that X, C, and U coverage is included.	
h. Excess or Umbrella Liability	
General Aggregate	\$3,000,000
Each Occurrence	\$1,000,000

2. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:

a. Bodily Injury:	
Each Person	\$500,000
Each Accident	\$3,000,000
b. Property Damage:	
Each Accident	\$3,000,000
or	
Combined Single Limit:	\$3,000,000
c. MCS 90 Endorsement on Vehicle Insurance:	Statutory

3. The Contractual Liability coverage required by Paragraph 5.04.B.3 of the General Conditions shall provide coverage for not less than the following amounts:

a. Bodily Injury:	
Each Person	\$500,000
Each Accident	\$3,000,000
b. Property Damage:	
Each Accident	\$500,000
Annual Aggregate	\$3,000,000

5. Builder's Risk-Installation Floater Cost to Replace at Time of Loss

SC-5.05 Owner's Liability Insurance

Delete Paragraph 5.05 in its entirety and insert the following in its place:

- A. Contractor shall purchase and maintain Owner's and Contractor's Protective Liability Insurance which shall:
1. Policy to be written with Charter Township of Van Buren as the insured;
 2. Be written by the same insurance carrier as Contractor's Liability Insurance;
 3. be a separate policy to protect Owner, Landscape Architect/Engineer, their consultants, agents, employees and such public corporations in whose jurisdiction the Work is located for their liability for work performed by Contractor or Subcontractors under this Contract;
 4. Charter Township of Van Buren, its elected officials, employees, officers, agents, servants, members of boards and commissions, and ;
 5. name the following as additional insured:
 - a. Russell Design, Inc.
 - b. G2 Consulting Group, LLC
 6. be issued by an insurer who endorses the policy to reflect that, in the event of payment of any loss or damages, subrogation rights under these Contract Documents will be waived by the insurer with respect to claims against Owner or Landscape Architect/Engineer.
 7. provide coverage for not less than the following amounts:
 - a. Separate:

(1) Bodily Injury:	
Each Person	\$500,000
Each Accident	\$1,000,000
(2) Property Damage:	
Each Accident	\$1,000,000
Annual Aggregate	\$2,000,000
 - or**
 - a. Combined Single Limit: \$2,000,000

SC-5.06 Property Insurance

Add the following at the end of Paragraph 5.06.A.1:

Additional insureds under this Paragraph shall include the following:

- a. Russell Design, Inc.
- b. G2 Consulting Group, LLC

Add the following language immediately after Paragraph 5.06.A.2:

and shall also include flood, start-up and testing and offsite storage, and equipment breakdown insurance.

Add the following new paragraph immediately after Paragraph 5.06.A.7

8. be issued by an insurer who endorses the policy to reflect that, in the event of payment of any loss or damages, subrogation rights under these Contract Documents will be waived by the insurer with respect to claims against Owner or Engineer.

SC-5.09 Acceptance of Bonds and Insurance; Option to Replace

Amend the first sentence of Paragraph 5.09.A to read as follows after the words "in writing:"

within 10 days after receipt of the bonds and certificates (or other evidence requested) required by Paragraph 2.01.

SC-5.10 Partial Utilization, Acknowledgment of Property Insurer

Add the following new paragraph immediately after Paragraph 5.10.A:

None.

ARTICLE 6 – CONTRACTOR'S RESPONSIBILITIES

SC-6.03 Services, Materials and Equipment

Add the following language at the end of Paragraph 6.03.A:

Owner requires that the rates of wages and fringe benefits to be paid to each class of mechanics by Contractor and all Subcontractors shall be not less than the wage and fringe benefit rates prevailing in the locality in which the Work is to be performed.

SC-6.06 Concerning Subcontractors, Suppliers and Others

Add the following language after Paragraph 6.06.B:

Contractor shall submit, within 2 days after the opening of Bids, a list of the following Subcontractors and Suppliers for acceptance by Engineer and Owner:

Owner Provided Suppliers and Installers:

- a. None

Add a new paragraph immediately after Paragraph 6.06.G:

H. Owner may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

SC-6.08 Permits

Add the following language at the end of Paragraph 6.08.A:

Additional provisions regarding permits and licenses are included in the General Requirements.

SC-6.09 Laws and Regulations

Add the following paragraph immediately after Paragraph 6.09.C:

D. Funding for the Project is provided by the Municipality, Downtown Development Authority, and Civic Fund.

E. Attention is called to the fact that not less than the minimum salaries and wages must be paid on this Project, and that the Contractor shall ensure that employees and applicants for employment are not discriminated against because of their race, color, religion, sex, or national origin. The Contractor shall abide by the Federal Wage Rate Determination which is referred to or contained in these Specifications.

F. The Contractor shall complete and submit to the Owner, weekly payroll forms as required by HUD. A sample copy of these payroll forms is included in these Specifications.

G. The Federal Wage Determination which is included in these documents is the determination which was in effect at the time this project went out to bids. However, if another Federal Wage Determination is in effect at the time of Bid opening, that Wage Determination shall apply to this Project.

SC-6.17 Shop Drawings and Samples

Add the following new paragraphs immediately after Paragraph 617.E:

- G. Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than two submittals. Landscape Architect/Engineer will record Engineer's time for reviewing subsequent submittals of Shop Drawings, samples, or other items requiring approval and Owner will deduct amount paid for Engineer's charges for such time from payment to Contractor.

- G. In the event that Contractor requests a change of a previously approved item, Contractor shall reimburse Owner for Engineer's charges for its review time unless the need for such change is beyond the control of Contractor.

ARTICLE 8 – OWNER'S RESPONSIBILITIES

SC-8.11 Evidence of Financial Arrangements

Add the following new paragraph immediately after Paragraph 8.11.A:

- B. On request of Contractor prior to the execution of any Change Order involving a significant increase in the Contract Price, Owner shall furnish to Contractor reasonable evidence that adequate financial arrangements have been made by Owner to enable Owner to fulfill the increased financial obligations to be undertaken by Owner as a result of such Change Order.

ARTICLE 11 – COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

SC-11.03 Unit Price Work

Delete Paragraph 11.03.D in its entirety and insert the following in its place:

- D. The unit price of an item of Unit Price Work shall be subject to reevaluation and adjustment under the following conditions:
 - 1. if the Bid price of a particular item of Unit Price Work amounts to 10% or more of the Contract Price and the variation in the quantity of that particular item of Unit Price Work performed by Contractor differs by more than 25% from the estimated quantity of such item indicated in the Agreement; and
 - 2. if there is no corresponding adjustment with respect to any other item of Work; and
 - 3. if Contractor believes that Contractor has incurred additional expense as a result thereof or if Owner believes that the quantity variation entitles Owner to an adjustment in the unit price, either Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Article 10 if the parties are unable to agree as to the effect of any such variations in the quantity of Unit Price Work performed.

ARTICLE 12 – CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

SC-12.01 Change of Contract Price

Amend Paragraphs 12.01.B.2 and 12.01.B.3 by adding the following words after the term "lump sum": "or unit price".

SC-12.01.C Contractor's Fee

Delete the semicolon at the end of GC 12.01.C.2.c, and add the following language:

, provided, however, that on any subcontracted work the total maximum fee to be paid by Owner under this subparagraph shall be no greater than 27 percent of the costs incurred by the Subcontractor who actually performs the work;

ARTICLE 14 – PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02.A Applications for Payment

Add the following new paragraph immediately after Paragraph 14.02.A.3:

4. Contractor shall indicate on the Application for Payment the amounts which are due to Owner from Contractor in accordance with the Contract Documents and which amounts Owner may deduct from the progress payment.

SC-14.02.B Review of Applications

Add the following new paragraphs immediately after Paragraph 14.02.B.5.d:

- d. Contractor has incurred liability for other costs in accordance with Contract Documents.
- e. liability for liquidated damages has been incurred by Contractor.
- f. of Contractor's failure to maintain record documents in accordance with Paragraph 6.12.

ARTICLE 15 – SUSPENSION OF WORK AND TERMINATION

SC-15.02 Owner May Terminate for Cause

Add the following new paragraph immediately after Paragraph 15.02.A.4:

5. Contractor has filed a bankruptcy petition and neither Contractor nor trustee has either assumed or rejected this Contract within 30 days after the filing of the bankruptcy petition.

END OF SECTION 00 7300

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SECTION 01 11 00 – SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work covered by the Contract Documents for the Charter Township of Van Buren, Owner. The project is located at 9401 Quirk Road, Charter Township of Van Buren Township, MI.

- A. The Work includes the following major items (dimensions are approximate):

1. Tree Protection Measures
2. Soil Erosion and Sedimentation Control (including permit)
3. Demolition
4. Field Engineering and Layout
5. Earthwork
6. Concrete Paving and Ramps
7. Asphalt Paving
8. Landscape Plantings and Accessories
9. Fine Grading and Sodded Lawn
10. Irrigation System

1.3 TYPE OF CONTRACT

- A. Construct the Work of this Contract under a single Unit Price Contract.

1.4 GENERAL

- A. Imperative Language: These Specifications (Divisions 01 through 49) are written in the imperative and abbreviated form. This imperative language of the technical specifications is directed at Contractor unless specifically noted otherwise. Incomplete sentences shall be completed by inserting "shall", "shall be" and similar mandatory phrases by inference in the same manner as they are applied to notes on Drawings. The words "shall", "shall be" and similar mandatory phrases shall be supplied by inference where a colon (:) is used within sentences or phrases. Except as worded to the contrary, fulfill (perform) all indicated requirements whether stated in the imperative or otherwise.
- B. Related Sections: Some Sections of these Specifications (Divisions 01 through 49) may include a paragraph titled "Related Sections". This paragraph is an aid to the Project Manual user and is not intended to include all Sections which may be related. It is Contractor's obligation to coordinate all Sections whether indicated under "Related Sections" or not.
- C. Reference to the General Conditions: In Divisions 01 through 49, a reference to the General Conditions includes by inference all amendments or supplements in the Supplementary Conditions.

1.5 OWNER FURNISHED MATERIAL

- A. Products furnished by independent vendor and paid for by Owner:
 1. Site Furnishings
- B. Owner's Responsibilities:
 1. Furnish Site Furniture
 2. Arrange for and deliver Shop Drawings, Product data and Samples to Architect.
 3. Arrange and pay for Product delivery to Site.
 4. On delivery, inspect Products jointly with Contractor.
 5. Submit claims for transportation damage.
 6. Arrange for replacement of damaged, defective, or missing items.
 7. Arrange for Manufacturer's warranties, inspections, and service.

- C. Contractor's Responsibilities:
 - 1. Coordinate delivery schedule of material to site with Owner and Supplier.
 - 2. Receive and unload Products at Site (Site furniture only); inspect for completeness and damage jointly with Owner.
 - 3. Handle, store, install (per manufacturer specifications) and protect installed components
 - 4. Repair or replace items damaged by the Work of this Contract.

1.6 WORK BY OWNER

- A. The following items will be furnished and installed by Owner:

Items identified on the drawings provided and installed by Owner contracted vendors.

- B. Coordinate schedule and implementation of work by Owner contracted vendors to ensure seamless implementation.
- C. Coordinate as necessary with Owner contracted vendors.

1.7 WORK UNDER OTHER CONTRACTS

- 1. Monument sign
- 2. Native seeding area

1.8 PROCUREMENT CONTRACTS

- A. The Owner has executed a Procurement Contract for the following Equipment:
 - 1. Site Furniture. Owner will furnish and deliver to site or coordinate same with selected contractor.
 - a. Contractor shall install site furniture per manufacturer's specifications.

1.9 CONTRACTOR USE OF PREMISES

- A. Limit use of premises to allow for public access, only upon substantial completion
- B. Limit construction traffic access to Project site from access points as approved by Owner
- C. Coordinate use of premises under direction of the Owner.
- D. Where the Contract Documents identify certain site elements within the construction limits, such as sidewalks, drives, and streets, that must be kept open for public or the Owner's use during construction, the Contractor shall be responsible for protection and maintenance of such elements as well.
- E. Except in connection with the safety or protection of persons or the Work or property at the Site or adjacent thereto, all Work at the site shall be restricted to the following hours:
 - 1. Monday through Friday (Except Legal Holidays): 8:00 a.m. to 5:00 p.m.
 - 2. Saturday, Sundays or legal holidays with written approval of the Owner.
- F. Work Within Rights-of-Way: In accordance with Division 01 Section "Regulatory Requirements."
- G. Private Easements:
 - 1. The Owner will arrange for the necessary easements required for construction across privately-owned land. The Contractor shall carry on the construction in such a manner as to cause a minimum of inconvenience to the occupants of the properties.
 - 2. Any agreement made by the Contractor with any property owner that extends the rights as granted under an easement obtained by the Owner or that provides for an additional easement shall be obtained by the Contractor at the Contractor's expense and shall in no way be binding upon the Owner. The Contractor shall defend and hold the Owner and the Engineer harmless against any action that may arise from activities conducted pursuant to such additional agreements or easements. Unless relieved of responsibility for surface

restoration in writing by property owner, the Contractor shall restore areas covered by separate agreements substantially the same as similar areas within the Project.

1.10 OCCUPANCY REQUIREMENTS

- A. Owner Occupancy During Construction:
1. The Owner will occupy or utilize premises during entire period of construction. Cooperate with the Owner to minimize conflict and to facilitate the Owner's operations.
 2. Access to Abutting Properties: Provide at all times.
 3. Access for Emergency Vehicles:
 - a. Provide at all times.
 - b. Provide at least one clear lane during non-work periods.
 4. Fire Hydrants: Provide access to at all times.
 5. Do not block fire access routes from buildings.
 6. Detours and Street Closure:
 - a. When provided for in the Contract Documents or approved by the Engineer.
 - b. Routes and barricades as indicated or as approved by road authority.
 7. Construct Work so as to not interfere with VBT Park Operations in accordance with this Section.
 8. Limit parking for construction vehicles to an area designated as indicated on the Drawings.

1.11 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner and Engineer.
- B. Sequence Submittal:
1. The sequence indicated below is offered as a suggestion to the Contractor.
 2. Submit a proposed sequence with appropriate times of starting and completion of tasks to Engineer for review.
- C. The following sequence and intermediate dates are suggested to accommodate Owner's completion date. **The Contractor shall submit its own schedule indicating how it will achieve the required results.**
- D. Owner Milestone Dates:
1. August 5, 2022 : Recommendation of Contractor and Bid Tabulation to Township.
 2. August 16, 2022: Agreement brought before the Township Board for Approval
 3. August 22, 2022: Construction Begins
 4. November 11, 2022: Substantial Completion
 5. November 30, 2022: Project Completion
- E. The above schedule milestones must be included in the overall construction schedule and shall also include coordination and installation of vendor supplied/installed materials.
1. None

PART 2 - PRODUCTS

2.1 OTHER MATERIALS

- A. General: All other materials which are not specified herein and are not indicated on the Drawings but are required for proper and complete performance of the Work.

- B. Procedure:
1. Select new, first quality material.
 2. Obtain Architect's review and approval.
 3. Provide and install.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 1100

SECTION 01 1813 – PROTECTION, RESTORATION AND NOTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes responsibilities for the protection, restoration and notification requirements for surface and subsurface structures, Underground Facilities, and surface improvements.

1.3 NOTIFICATION AND INTERRUPTIONS

- A. Prior to Start of Construction:
 - 1. Notify MISS DIG at least 72 hours in advance at 1.800.482.7171.
 - 2. Arrange for the identification of the locations of existing Underground Facilities at or contiguous to the Site.
 - 3. Coordinate utility connection with each utility provider.
- B. Utility Interruptions:
 - 1. Provide standby utility service for an interruption exceeding 2 hours or as approved by the Owner.
 - 2. Provide 48 hours' notice to the affected occupants of the time and duration of the anticipated shut off.
 - 3. Notify Fire Department 48 hours in advance if water main or fire supply line shut off is required.
 - 4. Pay all costs relating to utility interruptions.

1.4 PROTECTION AND RELOCATION

- A. Be Responsible For:
 - 1. Protection of structures and utilities at or contiguous to the Site in accordance with the General Conditions.
 - 2. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are damaged as a result of Contractor's operations.
 - 3. Cost of cleaning, repair, relocation, raising, lowering, or replacement of structures and utilities which are identified on the Drawings for relocation.
 - 4. Temporary sheeting, bracing, poles, cables, sand fill or other means used to support a structure or utility exposed or endangered by Contractor's operations.
 - 5. Relocating, raising, or lowering of a structure or utility for Contractor's convenience.
- B. Relocation of Poles and Structures:
 - 1. Be responsible for temporary and permanent relocation of power, light, telephone and other service poles and appurtenant structures that are identified on the Drawings for relocation.
 - 2. Make necessary arrangements with the owner of the pole or structure and pay all costs involved for items identified on the Drawings for temporary or permanent relocation.

1.5 RESTORATION

- A. Acceptable Standards for Restoration:
 - 1. Restore to the better of:
 - a. Original condition.
 - b. Requirements of the Contract Documents.
 - c. Current MDOT Standard Specifications for Construction.
 - d. MDOT Standard Plans.
- B. Property Corners, Government Survey Corners, and Plat Monuments:
 - 1. Protect from damage or disturbance.
 - 2. Protect discovered points until Engineer or Owner has witnessed or otherwise referenced their locations.
 - 3. Replace if disturbed or removed as a result of construction:

- a. Arrange for replacement by a Licensed Land Surveyor.
 - b. Pay all costs.
- C. Driving Surfaces and Similar Improvements:
1. Repair or replace damaged or removed surfaces as indicated on the Drawings and as specified herein.
 2. Adjust to temporary or final grade all new and existing castings (water valve boxes, manholes, catch basins and similar structures) for all gravel, bituminous or concrete surfacing or resurfacing.
- D. Landscaping and Miscellaneous Improvements:
1. Includes, but is not limited to, topsoil, seeded areas, shrubs, trees, decorative plantings, irrigation, and other similar items.
 2. Protect from damage by construction operations. In event of damage, replace damaged item with one of equivalent type and size.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 SURFACE RESTORATION

- A. Unless otherwise specified or indicated on the Drawings, perform the following surface restorations:
1. System Descriptions:
 - a. Turf Establishment - Sodding:
 - 1) Topsoil Thickness: 4 inches.
 - 2) Perform final grading, watering, backfilling of washouts, and related work.
 - 3) Sodded areas shall be weed free and established prior to acceptance.
 - b. Landscaping:
 - 1) New, items shall be healthy and growing prior to acceptance.
 - 2) Watering is Contractor's responsibility and an incidental expense.
 2. Material requirements for surface restoration unless specified otherwise:
 - a. Turf Materials
 - b. Landscaping Materials
 - c. All Other Materials: Incidental and as required.
 3. Construction Standards for Surface Restoration: Comply with requirements specified or indicated on the Drawings.

3.2 PAYMENT FOR UTILITIES AND ASSOCIATED STRUCTURES

- A. Payment for Work on Utilities and Associated Structures:
1. If Work is by Utility Company: Pay costs.
 2. If Work is by Contractor: Perform work in accordance with the requirements of utility company or authority having jurisdiction.

END OF SECTION 01 1813

SECTION 01 2200 – UNIT PRICES – MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes descriptions of the method of measurement and the basis of payment for Unit Price Work under this Contract.
- B. Basis of Contract Payments:
 - 1. Final Contract Price shall be determined by actual quantities installed at unit prices stated in Contractor's Bid.
 - 2. Engineer shall determine actual as-built quantities.
 - 3. All work identified on the Drawings, but not included as a Bid item shall be considered incidental to construction and not paid for directly.
 - 4. Unit price payments for individual items shall include everything necessary for such item to function as intended in the system.
 - 5. Owner reserves the right to increase, decrease or eliminate any quantities for items listed in Contractor's Bid or which become a part of the Contract Documents.
- C. Items included as incidental to Unit Prices for systems and appurtenances. Unless there is a specific pay item identified, the unit price payment shall include, but not be limited to:
 - 1. Clear, excavate, trench, bedding, trench backfill, compaction, disposal of items for clearing and unsuitable or excess excavated materials.
 - 2. Drainage of excavations including by-pass pumping of sewers if necessary Temporary sheeting, bracing, and shoring of excavations.
 - 3. Support, relocation, replacement, connection or reconnection of existing pipelines and utilities.
 - 4. Cleanup and surface restoration.
 - 5. Water service repair.
 - 6. Sewer lead repair.
 - 7. Bulkhead of pipes to be abandoned.
 - 8. Removal of pipes, valves, structures, and appurtenances located within the excavation limits of new utilities whether identified on the removal Drawing or not.
 - 9. Support of utility poles and existing underground utilities during excavation and installation of proposed improvements.
 - 10. Remove, salvage, and replace existing signs as directed.
 - 11. Temporary enclosures and sources of heat and humidity control to allow construction activity to proceed during cold weather and adverse conditions.
 - 12. Contractor shall always protect the public from the work zone.

1.3 GENERAL CONDITIONS

- A. Item No. 1 – Bonds and Insurance:
 - 1. Includes:
 - a. Provide insurance, bonds, and other costs associated with the project in general and not included in other pay items.
 - 2. Unit of Measure:
 - a. Lump sum
- Item No. 2 – Mobilization:
 - 3. Includes:
 - a. Preparatory work and expenses incurred prior to beginning work onsite.
 - b. Transport materials, personnel, and equipment to the job site.
 - c. Establish temporary onsite construction facilities.

- d. Provide insurance, bonds, and other costs associated with the project in general and not included in other pay items.
- e. All required submittals.
- 4. Unit of Measure:
 - a. Lump sum

1.4 SOIL EROSION CONTROL

- A. Item No. 3 – Soil Erosion and Sedimentation Control:
 - 1. Includes the following in accordance with Division 31, Division 01 and Division 32
 - a. Provide and maintain required soil erosion and sedimentation control measures indicated on the drawings and any other measure necessary to adequately control soil erosion and sedimentation.
 - b. Provide and maintain tree protection fencing.
 - c. Remove temporary soil erosion and sedimentation control measures after site is stabilized.
 - d. Place protective snow fence around restored areas after substantial completion to protect seeded areas from public foot traffic, until lawn is ready for mowing or until released by Owner.
 - e. Pay for and obtain permit
 - 2. Unit of Measure:
 - a. Lump sum.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 2200

SECTION 01 2300 - ALTERNATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. This Section identifies each Alternate by number, and describes the basic changes to be incorporated into the Work, only when that Alternate is made a part of the Work by specific provisions in the Owner-Contractor Agreement.
- B. Alternates schedules below are part of the Bidding Documents and will be considered in selection of Contractors and awarding contracts.
- C. Unless otherwise provided, Owner will accept or reject alternate within sixty (60) days. Owner reserves the right to reject any or all Alternates.

1.03 ALTERNATES:

A. General:

- 1. The description for each Alternate listed in the schedule are primarily scope definitions, and do not necessarily detail the full range of materials and processes needed to complete the work as required.
- 2. Refer to applicable specification sections (Division 2 through 16), and to applicable drawings, for specific requirements of the work, regardless of whether references are so noted in description of each alternative.
- 3. Coordinate pertinent related work and notify surrounding work as required to properly integrate the work under each Alternate, and to provide the complete construction required by Contract Documents.
- 4. Referenced sections of specifications stipulate pertinent requirements for products and methods to achieve the work stipulated under each Alternate.

B. Schedule:

1. No. 1 Lawn:

- a. Quote change in price to substitute sodded lawn on 4" imported topsoil for seeded lawn on 4" imported topsoil. See specifications and details.

2. No. 2 Asphalt

- a. Quote change in price to substitute milling, grading of existing asphalt and drive with 3-1/2" HMA for removal and replacement of asphalt and base, 21AA base with 3-1/2" HMA. See specifications and details.

3. No. 3 Haggerty Road Frontage Fence

- a. Quote change in price to substitute pressure treated wood posts, cedar rail fence with pressure treated posts, composite post sleeve, cap and square edge railing. See specifications and details.

PARTS 2 AND 3 - PRODUCTS AND EXECUTION

Not Applicable.

END OF SECTION 01 2300

SECTION 01 2513 – PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the administration of substitutions and Product options.

1.3 SUBMITTALS

- A. List of all products proposed for installation:
 - 1. Submit (3) hard copies **or** (1) electronic (.pdf) submittal within 30 days after the Effective Date of Agreement unless otherwise indicated elsewhere in the Contract Documents.
 - 2. Tabulate the list by each Specification Section.

1.4 CONTRACTOR'S OPTIONS

- A. Products specified only by reference standards or by description:
 - 1. Select any Product meeting the standards or description by any Supplier unless otherwise required elsewhere in the Contract Documents.
 - 2. Submit for Landscape Architect's/Engineer's review:
 - a. Name and address of Supplier.
 - b. Trade name.
 - c. Model or catalog designation.
 - d. Manufacturer's data including:
 - 1) Performance and test data.
 - 2) Compliance with reference standards.
- B. Products specified by naming one or more suppliers without an "or approved substitute" clause:
 - 1. Use specified Product of one of the Suppliers named.
 - 2. No substitutions.
- C. Products specified by naming one or more suppliers with an "or equal/approved substitute" clause:
 - 1. Indicates the option of selecting equivalent Products by stating or "equal/approved substitute" after the specified Suppliers.
 - 2. Engineer may waive some or all of the requirements specified for substitutions if, at Engineer's sole discretion, the proposed equivalent Product is considered an "or equal/approved substitute".
 - 3. If, at Engineer's sole discretion, the proposed equivalent Product does not qualify as an "or equal/approved substitute", it will be considered as a proposed substitute and a substitution request submittal will be required.

1.5 SUBSTITUTIONS

- A. Substitutions after the effective date of agreement:
 - 1. Within 30 days after the Effective Date of Agreement.
 - 2. Engineer will consider formal requests for substitution of Products in place of those specified unless otherwise prohibited elsewhere in the Contract Documents.

- B. Substitution Request Submittals: Submit (3) hard copies or (1) electronic (.pdf) submittal of the request for substitution including the following:
1. Complete data substantiating compliance of the proposed substitution with the Contract Documents.
 2. For Products:
 - a. Names and addresses of Manufacturer and Supplier.
 - b. Product identification.
 - c. Manufacturer's literature, including:
 - 1) Product description.
 - 2) Performance and test data.
 - 3) Reference standards.
 - d. Samples.
 - e. Name and address of similar projects on which the Product was used and date of installation.
 3. For Construction Methods:
 - a. Detailed description of the proposed method.
 - b. Drawings illustrating methods.
 4. Itemized comparison of proposed substitution with Product or method specified.
 5. Data relating to changes in the construction schedule.
 6. Accurate cost data on the substitution and comparison with the Product or method specified.
 7. Changes to the Work which would be caused by the substitution.
- C. Contractor's Responsibilities: In making a request for a substitution, Contractor represents:
1. Contractor has personally investigated the proposed Product or method and determined that it is equal or superior in all respects to that which is specified.
 2. Contractor will provide the same guarantee for the substitution as for the Product or method specified.
 3. Contractor will coordinate installation of the accepted substitution into the Work making such changes as may be required for the Work to be completed in all respects.
 4. Contractor waives all claims for additional cost related to the substitution which consequently become apparent.
 5. Cost data is complete and includes all related costs under Contractor's contract but excludes costs under separate contracts and Engineer's redesign costs.
- D. Substitutions Not Considered: Substitutions will not be considered if:
1. They are indicated or implied on Shop Drawings or Product data submittals without formal request submitted in accordance with this Section.
 2. Acceptance will require substantial revision of the Contract Documents.

Not used.

PART 2 - EXECUTION

Not used.

END OF SECTION 01 2513

SECTION 01 2600 – CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedures for modifying the Contract Documents.

1.3 DEFINITIONS

- A. Abbreviation: Request for Information (RFI).
- B. Terms:
 - 1. Bulletin: A document delineating possible changes to the Contract Documents which is issued by Engineer for Owner and requests add or deduct costs from Contractor.
 - 2. Field Order: As defined in the General Conditions, a written order issued by Engineer which requires minor changes in the Work, but which does not involve a change in the Contract Price or the Contract Times.
 - 3. Work Change Directive: As defined in the General Conditions, a written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies.
 - 4. Change Order: As defined in the General Conditions, a document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
 - 5. Request for Information: A written document initiated by Contractor which requests clarifications to items of the Work from Engineer.

1.4 BULLETIN

- A. Procedures: As indicated herein and on form following this Section.
- B. Changes in Cost:
 - 1. Indicate add or deduct lump sum or unit price for each item.
 - 2. Include:
 - a. Labor.
 - b. Material.
 - c. Overhead and profit.
 - d. All related work.
 - e. All trades and Subcontractors.
 - 3. Provide a complete cost breakdown with supporting documentation.
- C. Notification to Engineer: Notify Engineer in writing if any of the listed items will cause a change in the Work for which a cost item is not provided in this Bulletin.
- D. Submit:
 - 1. One copy.
 - 2. To Engineer/Landscape Architect.
 - 3. On or before due date noted.
- E. If Bulletin is accepted, Owner may issue one or more Change Orders for some, or all items listed.

1.5 FIELD ORDER

- A. Changes in Contract Price or Contract Times not permitted by use of Field Orders.
- B. Format:
 - 1. May take form of any written communication mutually acceptable to Engineer and Contractor, including, but not necessarily limited to:
 - a. Letter.
 - b. Facsimile transmission.
 - c. Hand drawn or computer generated sketch.
- C. Procedures: Refer to the General Conditions.

1.6 WORK CHANGE DIRECTIVE

- A. Procedures: Refer to the General Conditions and form following this Section.

1.7 CHANGE ORDER

- A. Procedures: Refer to the General Conditions and form following this Section.

1.8 REQUEST FOR INFORMATION

- A. Changes in Contract Price or Contract Times not permitted by use of RFIs.
- B. Format:
 - 1. Use the enclosed RFI form or, at Contractor's option, generate form.
 - 2. Minimum required content of Contractor's RFI form:
 - a. Project name.
 - b. Name and address of Contractor.
 - c. RFI number.
 - d. RFI date.
 - e. Name of initiator.
 - f. Complete written request, with sketches as required.
 - g. Signature of initiator.
 - h. Space for written response by Engineer, with signature and date of Engineer's representative.
- C. Procedures:
 - 1. Maintain a log of RFIs, including the RFI date and the date of the response.
 - 2. Allow at least 15 full working days for Engineer's response following Engineer's receipt of RFI.
 - 3. Submit written justification for shorter response time.
 - 4. Do not submit RFIs for information already included in the Contract Documents.
 - 5. Illegitimate RFIs may be cause for deductions in the Contract amount. See the Supplementary Conditions.
 - 6. RFIs submitted directly by subcontractors or vendors will be rejected.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 SCHEDULES

- A. Attached are the following forms:
 - 1. Bulletin.
 - 2. Work Change Directive.
 - 3. Change Order.
 - 4. Request For Information.

BULLETIN
PAGE 1 OF 2

BULLETIN NO.:
DATE:
DUE DATE:

<p>CONTRACT FOR:</p> <p>OWNER:</p> <p>CONTRACTOR:</p> <p>ENGINEER:</p> <p>DRAWING REVISION NO.:</p> <p>ISSUED HEREWITH:</p> <p> SPECIFICATION SECTIONS:</p> <p> SKETCHES:</p> <p> SHEETS:</p> <p>DISTRIBUTION:</p>
<p>The items below are being considered as possible changes to the Contract Documents for this Project. Contractor is requested to submit changes in cost, if any, for each item and indicate whether it is an addition to or deduction from the Contract Price. Include all labor, materials, overhead and profit. After reviewing the effects of those changes in the Work, Owner may issue a Change Order specifying which changes are to be incorporated in the Work, if any.</p> <p>This Bulletin is not a Change Order and is not to be deemed authorization to proceed with the changes listed.</p> <p>Additional work or materials, where proposed, shall meet the requirements of the Contract Documents, except where noted.</p> <p>Contractor will be responsible for notifying Engineer, in writing, concerning any revision or clarification which causes a change in the Contract Documents, but not specifically mentioned as a cost item in this Bulletin.</p> <p>Contractor shall return one (1) completed and signed copy of the Bulletin to Engineer on or before the due date noted above.</p> <p>Each proposed change has been described briefly with additional information provided concerning detailed changes required for the major trades concerned. Only one total cost figure has been requested for each item on the Bulletin; however, a complete breakdown is required for each item as supporting documentation. This will allow Owner to more easily evaluate the proposed cost changes. Each Bulletin item is an all-inclusive item and may concern work from several trades or Subcontractors. It is Contractor's responsibility to ensure that all work for each item has been included in the total cost figure provided to Owner.</p>

BULLETIN
PAGE 2 OF 2

ITEM NO. 1:

Section _____ - [Title] _____ :
[Paragraph] _____

ADD/DEDUCT: \$ _____

ITEM NO. 2:

Section _____ - [Title] _____ :
[Paragraph] _____

ADD/DEDUCT: \$ _____

ITEM NO. 3:

Sheet(s) _____ - [Title] _____ :

ADD/DEDUCT: \$ _____

ITEM NO. 4:

Sheet(s) _____ - [Title] _____ :

ADD/DEDUCT: \$ _____

Contractor:

Signature

Name and Title of Signatory

Date

END OF BULLETIN

WORK CHANGE DIRECTIVE
PAGE 1 OF 1

WORK CHANGE DIRECTIVE NO.
DATE OF ISSUANCE:
EFFECTIVE DATE:

CONTRACT FOR:
OWNER:
CONTRACTOR:
ENGINEER:
ATTACHMENTS:
CONTRACTOR IS DIRECTED TO PROCEED PROMPTLY WITH THE FOLLOWING CHANGE(S) IN THE CONTRACT DOCUMENTS:

Authorization for Work described herein to proceed on the basis of Cost of the Work due to:

- Nonagreement on pricing of proposed change.
- Necessity to expedite Work described herein prior to changes on Contract Price and Contract Time.

Estimated change in Contract Price and Contract Times:

Contract Price _____ (increase/decrease) Contract Time (Days) _____ (increase/decrease)

Recommended for
Approval by Engineer: _____ Date: _____

Authorized for Owner by: _____ Date: _____

Received for Contractor by: _____ Date: _____

Received by
Funding Agency (if applicable): _____ Date: _____

END OF WORK CHANGE DIRECTIVE

WORK CHANGE DIRECTIVE INSTRUCTIONS

A. GENERAL INFORMATION:

This document was developed for use in situations involving changes in the Work which, if not processed expeditiously, might delay the Project. These changes are often initiated in the field and may affect the Contract Price or the Contract Times. This is not a Change Order, but only a directive to proceed with Work that may be included in a subsequent Change Order.

For supplemental instructions and minor changes not involving a change in the Contract Price or the Contract Times, a Field Order may be used.

B. COMPLETING THE WORK CHANGE DIRECTIVE FORM:

Engineer initiates the form, including a description of the items involved and attachments.

Once Engineer has completed and signed the form, all copies should be sent to Owner for authorization because Engineer alone does not have authority to authorize changes in Price or Times. Once authorized by Owner, a copy should be sent by Engineer to Contractor.

Once the Work covered by this directive is completed or final cost and times are determined, Contractor should submit documentation for inclusion in a Change Order. Price and Times may only be changed by Change Order signed by Owner and Contractor with Engineer's recommendation.

This is a directive to proceed with a change that may affect the Contract Price or the Contract Times. A Change Order, if any, should be considered promptly.

CHANGE ORDER
 PAGE 1 OF 1

CHANGE ORDER NO.:
 DATE:

CONTRACT FOR: OWNER: CONTRACTOR: ENGINEER: ATTACHMENTS:
Contractor shall indicate approval of Change Order through signing of this document and returning to Engineer. Engineer will forward to Owner, who shall indicate approval of Change Order through signing of this document and returning to Engineer. Upon receipt of fully executed (all signatures) Change Order, Engineer will distribute to all parties.
YOU ARE DIRECTED TO MAKE THE FOLLOWING CHANGES IN THE CONTRACT DOCUMENTS:

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIMES:
Original Contract Price:	Original Contract time:
\$	Substantial Completion:
Previous Change Order No.:	Ready for final payment:
\$	Net change from previous Change Orders:
Contract Price prior to this Change Order:	<u>Days</u>
\$	Contract Time prior to this Change Order:
Net of this Change Order:	Substantial Completion:
\$	Ready for final payment:
Contract Price with all approved Change Orders:	Net of this Change Order:
\$	<u>Days</u>
Contract Price with all approved Change Orders:	Contract Time with all approved Change Orders:
\$	Substantial Completion:
	Ready for final payment:

RECOMMENDED	APPROVED	APPROVED
By: _____	By: _____	By: _____
Engineer	Contractor	Owner
_____ Name and Title of Signatory	_____ Name and Title of Signatory	_____ Name and Title of Signatory
Date: _____	Date: _____	Date: _____

END OF CHANGE ORDER

CHANGE ORDER INSTRUCTIONS

A. GENERAL INFORMATION:

This document was developed to provide a uniform format for handling contract changes that affect Contract Price or Contract Times. Changes that have been initiated by a Work Change Directive must be incorporated into a subsequent Change Order if they affect Contract Price or Contract Times.

Changes that affect Contract Price or Contract Times should be promptly covered by a Change Order. The practice of accumulating Change Order items to reduce the administrative burden may lead to unnecessary disputes.

If Milestones have been listed in the Agreement, any effect of a Change Order thereon should be addressed.

For supplemental instructions and minor changes not involving a change in the Contract Price or Contract Times, a Field Order may be used.

B. COMPLETING THE CHANGE ORDER FORM:

Engineer normally initiates the form, including a description of the changes involved and attachments based upon documents and proposals submitted by Contractor, or requests from Owner, or both.

Once Engineer has completed and signed the form, all copies should be sent to Contractor for acceptance. After acceptance by Contractor, all copies should be sent to Owner for acceptance. Engineer should make distribution of executed copies after approval by Owner.

If a change only applies to Contract Price or to Contract Times, indicate "N/A" (Not Applicable) in the part of the tabulation that does not apply.

Net "Increase" or "Decrease" in Price and Days should be included as applicable term.

REQUEST FOR INFORMATION
PAGE 1 OF 1

CONTRACT FOR:	PROJECT NO.:
OWNER:	
CONTRACTOR:	
ENGINEER:	
THE CONTRACTOR SHALL COMPLY WITH THE REQUEST FOR INFORMATION PROCEDURES IN DIVISION 01 SECTION "CONTRACT MODIFICATION PROCEDURES."	

RFI No.: _____

FTCH Project Manager: _____

REQUEST		
RFI From:	Signature:	Date:

RESPONSE		
Response From:	Signature:	Date:

END OF SECTION 01 2600

SECTION 01 29 16 – PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes submittal to the Owner's designee of Applications for Payment and supporting documentation as specified herein.

1.3 SUBMITTALS

- A. Application for Payment: Submit 3 copies on attached form.
- B. An incomplete or incorrect Application for Payment will constitute reason for refusing to recommend payment as indicated in Article 14 of the General Conditions.

1.4 FORMS

- A. Copies of the forms to be used for the above requirements are attached and include the following:
 - 1. Application for Payment.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

APPLICATION AND RECOMMENDATION FOR PAYMENT
 PAGE 1 OF 3

TO: **Charter Township of Van Buren**
 In Care of: Russell Design, Inc.
 114 Rayson Street, Suite 2A
 Northville, MI 48167

FROM (Contractor): _____

Application No: _____
 Period From: _____
 To: _____

Project: _____
 Project Number: _____

 APPLICATION FOR PAYMENT:

Application for Payment is made, as indicated below, in connection with the Contract. Schedule of Values sheet is attached as page 3 of 3.

- | | | |
|----|--|----------|
| 1. | Original Contract Price | \$ _____ |
| 2. | Net change by Change Orders | \$ _____ |
| 3. | Current Contract Price (1 plus 2) | \$ _____ |
| 4. | Gross Amount Due (From Unit Price Schedule | \$ _____ |
| 5. | Retainage (Per Agreement) _____% of Work Completed: \$ _____ | |
| | _____% of Stored Material: \$ _____ | |
| | Total Retainage | \$ _____ |
| 6. | Amount Eligible to Date (4 minus 5) | \$ _____ |
| 7. | Less Previous Payments | \$ _____ |
| 8. | Amount Due This Application (6 minus 7) | \$ _____ |
| 9. | Balance to Finish, Plus Retainage (3 – 7 – 8) | \$ _____ |

 CHANGE ORDER SUMMARY:

Change Orders Approved by Owner	ADDITIONS	DEDUCTIONS
Change Order No. 1 Change Order No. 2 Change Order No. 3 Change Order No. 4 Change Order No. 5		
Net Change by Change Orders		

APPLICATION AND RECOMMENDATION FOR PAYMENT
PAGE 2 OF 3

CONTRACTOR'S CERTIFICATION:

The undersigned Contractor certifies that to the best of its knowledge (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

Dated _____, 20____ Contractor _____
By _____
(Signature)

Name and Title of Signatory

LANDSCAPE ARCHITECT'S/ENGINEER'S RECOMMENDATION:

To: **Charter Township of Van Buren**

In accordance with the Contract, the undersigned recommends payment to Contractor.

AMOUNT RECOMMENDED:\$ _____
(Attach explanation if amount recommended differs from the amount applied for.)

LANDSCAPE ARCHITECT: Russell Design, Inc.

Dated _____, 20____ By _____
(Signature)

Name and Title of Signatory

This Recommendation is not negotiable. The AMOUNT RECOMMENDED is payable only to Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of Owner or Contractor under this Contract.

This recommendation for payment is based on a review of the Work performed as compared to the amount of the application. This recommendation does not imply that Engineer is reviewing construction lien documents nor does it imply that Engineer is acting as a guarantor of the property. Any review of construction lien documents by Engineer is for information purposes only.

APPLICATION AND RECOMMENDATION FOR PAYMENT
 PAGE 3 OF 3

Unit Price Schedule

A		B		C	D	E	F		G		
Bid Item No.	Item Description	Unit	Contractor's Bid		Bid Value	Work Completed		Materials Presently Stored (Not in C)	Total Completed and Stored to Date (D + E)	% (F/B)	Balance To Finish (B-F)
			Bid Quantity	Unit Price		Estimated Quantity Installed	Value				

In tabulations above, amounts are stated to the nearest dollar.
 Attach additional copies of Page 3 as required. Total on the last page.

END OF SECTION 01 2916

SECTION 01 3300 – SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedures for the submittal of Shop Drawings, Product Data, Samples, Operation and Maintenance Manuals, and other information.
- B. Related Sections include pertinent Sections of these Specifications for the individual Submittals required.

1.3 DEFINITIONS

- A. Submittal: Information sent by Contractor to convey information about systems, equipment, materials, products, and administrative matters for the Work.
- B. Resubmittal: Submittal sent for review a second or further time.
- C. Product Data: Illustrations, standard schedules, diagrams, performance charts, instructions, brochures, or manufacturer's literature that describe the physical size, appearance, and other characteristics of materials or equipment for a portion of the Work.
- D. Shop Drawings: Drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
- E. Samples: Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
- F. Action Submittals: Submittals that require Landscape Architect's/Engineer's response.
- G. Informational Submittals: Submittals that do not require Landscape Architect's/Engineer's response.
- H. Delegated-Design: In certain individual Specification Sections, design services or certifications by a design professional that are specifically delegated to the Contractor. Performance and design criteria are defined in the individual Specification Sections or on the Drawings. Contractor is solely responsible for design of those items or systems, coordination of the design with the balance of the Project and achieving specified performance.
- I. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTAL PROCEDURES

- A. Submittal Schedule:
 - 1. Prepare and submit a Submittal schedule that identifies the following for each Submittal:
 - a. Submittal number.
 - b. Submittal description.
 - c. Projected date Submittal will be submitted.

2. Submittal Numbers:
 - a. Use the applicable Specification Section number followed by a decimal point and then a sequential number (e.g., 06 10 00.1).
 - b. Resubmittals shall include a letter suffix after another decimal point (e.g., 06 10 00.1.A).
 - c. Submittals that are not numbered correctly may be rejected.
- B. Delivery Method:
 1. Submittals may be delivered as paper copies or electronic files at Contractor's option.
 2. Advise Landscape Architect's/Engineer of delivery method to be used at the preconstruction meeting.
 3. Where Submittals include information that is intended to be printed on sheets larger than 11 inches x 17 inches, or where scale or drawing size are critical for proper review, submit 2 paper copies for review.
 4. Paper Copies:
 - a. Unless indicated otherwise, submit 2 copies of each Submittal.
 - b. One copy of each Action Submittal will be returned to Contractor.
 - c. Extra copies submitted by Contractor will be discarded.
 5. Electronic Files:
 - a. Unless indicated otherwise, submit 1 copy of each Submittal in PDF format.
 - b. Scanned Submittals shall be produced in such a way as to not compromise the graphic quality or accuracy of scale, where applicable; and text shall be searchable.
 - c. One copy of each Action Submittal will be returned to Contractor.
 - d. Submittals may be transmitted via electronic mail (e-mail) or on a CD or DVD. Submittals that are transmitted electronically may be returned electronically at the Engineer's discretion.
 6. Transmit Submittals to party and address identified by Engineer at preconstruction meeting.
- C. Coordination and Timing: Coordinate preparation and processing of Submittals with performance of construction activities. Contractor is responsible for cost of delays caused by lack of coordination or tardiness of Submittals. Incomplete Submittals will be rejected.
 1. Coordinate each Submittal with fabrication, purchasing, testing, delivery, other Submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of Submittals for related parts of the Work so processing will not be delayed because of need to review Submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a Submittal requiring coordination with other Submittals until related Submittals are received.
- D. Processing Time: Allow 7 full working days for Engineer to review each Submittal, including Resubmittals. Time for review shall commence on Engineer's receipt of Submittal. No extension of the Contract Time will be authorized because of failure to transmit Submittals enough in advance of the Work to permit processing, including Resubmittals. Engineer will advise Contractor when a Submittal being processed must be delayed for coordination.
- E. Identification: Place a permanent label on each Submittal or generate a separate cover sheet.
 1. Indicate name of firm or entity that prepared Submittal.
 2. Provide space to record Contractor's review and approval markings and action taken by Engineer.
 3. Include the following information:
 - a. Project name.
 - b. Date.
 - c. Name and address of Landscape Architect/Engineer.
 - d. Name and address of Contractor.
 - e. Name and address of Subcontractor(s).
 - f. Name and address of Supplier(s).
 - g. Name of Manufacturer.
 - h. Submittal number, including revision identifier.
 - i. Drawing number and detail references, as applicable.
 - j. Location(s) where product is to be installed, as applicable.
 - k. Other necessary identification.
- F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on Submittals. Submittals that include deviations that are not identified may be rejected. Engineer may or may not consider deviations. Deviations are not substitutions. Refer to Division 01 Section "Product Substitution Procedures" for procedures regarding requests for substitutions.

- G. Transmittal: Package each Submittal individually and appropriately for transmittal and handling. Transmit each Submittal using a transmittal form. Engineer will reject Submittal(s) received from sources other than Contractor.
- H. Resubmittals: Make Resubmittals in same form and number of copies as initial Submittal.
 - 1. Note date and content of previous Submittal.
 - 2. Clearly identify additions and revisions.
 - 3. Resubmit Submittals until they are marked, "Reviewed," or "Reviewed with Comments."
- I. Distribution: Furnish copies of Submittals with mark indicating, "Reviewed," or "Reviewed with Comments," to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities.
- J. Use for Construction: Unless otherwise indicated by Landscape Architect/Engineer, use only Submittals with mark indicating, "Reviewed," or "Reviewed with Comments."

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. General: Prepare and submit project specific Action Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible.
- B. Product Data: Collect information into a single Submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for Submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each Submittal to indicate which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Color charts as required by individual Specification Sections.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
 - 4. Submit Product Data before or concurrent with Samples.
 - 5. Maintain copy of returned Submittal for Project records.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale where appropriate. Scale shall be sufficiently large to indicate pertinent features of the item and its method of connection to the Work.
 - 1. Preparation: Fully illustrate requirements of the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Colors and materials as applicable.
 - e. Roughing-in and setting diagrams.
 - f. Wiring diagrams showing field-installed wiring, including power, signal, control, and communication wiring. Differentiate between Manufacturer-installed and field-installed wiring.
 - g. Manufacturing instructions.
 - h. Templates and patterns.
 - i. Schedules.
 - j. Calculations.

- k. Compliance with specified standards.
 - l. Notation of coordination requirements.
 - m. Notation of dimensions established by field measurement.
 - n. Relationship to adjoining construction clearly indicated.
 2. Sheet Size: Submit Shop Drawings on sheets at least 8-1/2 inches x 11 inches but no larger than 24 inches x 36 inches.
 3. Maintain copy of returned Submittal for Project records.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements, and for a comparison of these characteristics between Submittal and actual component as delivered and installed.
1. Transmit Samples that contain multiple, related components, such as accessories, together in one Submittal package.
 2. Identification: On unexposed side of Samples, attach label that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of Manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 3. Samples for Initial Selection: Submit Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. Where Contract Documents indicate custom color or material, coordinate production of custom Samples with the Engineer and Manufacturer prior to submittal.
 - a. Number of Samples: Unless indicated otherwise, submit 2 full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from Manufacturer's product line. Engineer will return 1 Sample with options selected.
 4. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured, and finished in manner specified, physically identical with material or product proposed for use, and that show full range of color and texture variations expected.
 5. Samples include, but are not limited to, the following: Partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 6. Number of Samples: Unless indicated otherwise, submit 2 sets of Samples. Engineer will retain 1 Sample set; remainder will be returned.
 - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
 7. Disposition: Maintain sets of approved Samples at Site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used by Engineer to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples shall be in an undamaged condition at time of Substantial Completion.
 - b. Samples not incorporated into the Work, or otherwise designated to become Owner's property, are the property of Contractor.
- E. Operation and Maintenance Manuals:
1. General:
 - a. Where manuals are required to be submitted covering items included in the Work, prepare such manuals in durable plastic binders approximately 8-1/2 inches x 11 inches in size and with at least the following:
 - 1) Identification on, or readable through, the front cover stating general nature of the manual.
 - 2) Neatly typewritten index near the front of the manual.
 - 3) Complete instructions regarding operation and maintenance of equipment involved, including:
 - a) Equipment function, normal operating characteristics, and limiting conditions.
 - b) Assembly, installation, alignment, adjustment, and checking instructions.
 - c) Operating instructions for start-up, routine and normal operating, regulation and control, shutdown, and emergency conditions.
 - d) Maintenance instructions, including lubrication requirements where applicable.
 - e) Guide to "troubleshooting".

- f) Parts lists and predicted life of parts subject to wear.
 - g) Project specific outline and cross sections, assembly drawings, engineering data, and wiring diagrams. Wiring diagrams shall reflect final, as-installed conditions and include wire numbers.
 - h) Test data and performance curves.
 - 4) Complete nomenclature of all replaceable parts, their part numbers, current costs, and name and address of nearest vendor of parts.
 - 5) Copies of guarantees and warranties issued.
 - 6) Copies of the reviewed Submittals.
 - 7) Copies of data concerning changes made during construction.
2. Extraneous Data: Where contents of the manuals include Manufacturer's catalog pages, clearly indicate the precise items included in this installation and delete all Manufacturers' data with which this installation is not concerned. Do not use highlighting that would not be reproducible.
 3. Number of Copies Required: Unless otherwise specifically directed by Engineer, or stipulated in the pertinent Section of these Specifications:
 - a. For review, submit 1 paper or 1 electronic copy.
 - b. For record, deliver 3 paper copies or 1 electronic copy to Engineer.
 4. Schedule delivery of record copies of operation and maintenance manuals at least 60 days prior to start-up of respective equipment, unless otherwise specified.

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by individual Specification Sections. Do not use highlighting that would not be reproducible.
- B. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects/engineers and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on Manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by Manufacturer for this Project.
- F. Manufacturer Certificates: Prepare written statements on Manufacturer's letterhead certifying that Manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on Manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on Manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating current product produced by Manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by Manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Manufacturer's Instructions: Prepare written or published information that documents Manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of Manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.
- P. Manufacturer's Field Reports: Prepare written information documenting tests and inspections of factory-authorized service representative. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement of substrate condition and acceptability of substrate for installation or application of product.
 - 3. Statement that products at Site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Document settings in writing.
 - 8. Other required items indicated in individual Specification Sections.
- Q. Safety Data Sheets (SDSs): Submit information directly to Owner; do not submit to Engineer.
 - 1. Engineer will not review Submittals that include SDSs and will return the entire Submittal for Resubmittal.

2.3 DELEGATED-DESIGN SUBMITTALS

- A. Where design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated, which Contractor has coordinated with the balance of the Project.
- B. Performance type design documents and calculations shall be prepared by a design professional as required by the individual Specification Section, licensed in the State of Michigan where the Project is being constructed. Design documents shall be signed and sealed by the responsible design professional. Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list

of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Identify name and version of software, if any, used for calculations.

- C. In addition to Shop Drawings, Product Data, and other required Submittals, submit two copies of a statement, signed, and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each Submittal and check for coordination with other work of the Contract and for compliance with the Contract Documents. Verify field dimensions and conditions; note corrections as necessary. Mark with approval stamp before submitting to Landscape Architect/Engineer.
 - 1. Approval Stamp: Stamp each Submittal with an approval stamp. Use the same stamp format for each Submittal. Include Project name and location, Submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that Submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
- B. Submittals that are not approved and stamped by Contractor will be rejected.

3.2 LANDSCAPE ARCHITECT'S/ENGINEER'S REVIEW

- A. Action Submittals: Engineer will review Action Submittals, make marks to indicate corrections or modifications required, and return Submittal. Engineer will stamp each Submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Reviewed, No Exceptions Noted: Submittal appears to conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 - 2. Reviewed with Comments: Upon incorporation of review comments, it appears that Submittal will conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
 - 3. Revise and Resubmit: Submittal has one or more specific segments that are incomplete, do not appear to conform to the information given in the Contract Documents, or are incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Except as noted, Contractor shall not proceed with work related to Submittal.
 - 4. Rejected, Resubmit: Submittal as a whole is incomplete, does not appear to conform to the information given in the Contract Documents, or is incompatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Contractor shall resubmit information for review to demonstrate understanding of comments and portions of Work to be provided. Contractor shall not proceed with work related to Submittal.
- B. Informational Submittals: Other Submittals required by the Contract Documents are for information only. Engineer will acknowledge receipt of Informational Submittals. Such Submittals include, but are not limited to:
 - 1. Qualifications Data.
 - 2. Certificates.
 - 3. Test Reports.
 - 4. Manufacturer's Instructions.
 - 5. Maintenance Data.
 - 6. Field Reports.
- C. Delegated-Design Submittals: Review of Delegated-Design Submittals by Engineer shall not relieve Contractor of Contractor's sole responsibility for design and achieving specified performance.
- D. Submittals not required by the Contract Documents will be returned without being reviewed.

- E. Partial Submittals are not acceptable, will be considered non-responsive, and will be rejected.

3.3 RE-REVIEW COSTS

- A. Compensation:
 - 1. Should Engineer be required to review a Submittal more than twice because of failure of the Submittal to meet the requirements of the Contract Documents, Engineer will record Engineer's expenses for performing additional reviews.
 - 2. Owner will compensate Engineer for these additional services and deduct the amount paid from payments to Contractor.

END OF SECTION 01 3300

SECTION 01 3113 - PROJECT COORDINATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Contractor shall employ and pay for the Services of a full-time Project Coordinator for the duration of the Construction Work.
 - 1. Employ someone with not less than five years experience performing coordination work on projects of similar size and scope.
 - 2. Submit name and qualifications to Architect.
- B. Contractor shall additionally employ and pay for the full-time services of a General Superintendent whose duties and responsibilities are described elsewhere in the Contract Documents.
- C. If required, provide additional administrative and supervisory personnel as required for the performance of the work including coordination of the various subcontractors.
- D. Include all necessary coordination with splash pad and site furniture vendors.

1.02 RELATED REQUIREMENTS:

- A. All applicable sections of the specifications.
- B. Conditions of the Contract

1.03 PROJECT COORDINATOR'S DUTIES:

- A. Coordinate the work of the various subcontractors:
 - 1. For temporary utilities.
 - 2. With the work of trades.
- B. Coordinate the schedules of subcontractors.
 - 1. Verify timely deliveries of products for installation by other trades.
 - 2. Verify that labor and materials are adequate to maintain schedules.
- C. Conduct conferences among subcontractors and other concerned parties, as necessary to:

1. Maintain coordination and schedules
2. Resolve matters in dispute
- D. Participate in project meetings:
 1. Report progress of work
 2. Recommend needed changes in schedules
- E. Temporary Utilities:
 1. Coordinate installation, operation and maintenance, to verify compliance with project requirements and with Contract Documents.
 2. Verify adequacy of service at required locations.
- F. Shop Drawings, Product Data and Samples:
 1. Prior to submittal, review for compliance with Contract Documents.
 - a. Check field dimensions and clearance dimensions.
 - b. Check relation to available space.
 - c. Review the effects of any changes on the work of other contracts or trades.
 - d. Check compatibility with equipment and work of other trades.
- G. Coordination Drawings:
 1. Prepare, as required to assure coordination of work or to resolve conflicts.
 2. Submit for review and transmittal.
 3. Reproduce and distribute approved copies to all concerned parties.
- H. Observe required testing; maintain a record of tests.
 1. Testing agency and name of inspector
 2. Subcontractor
 3. Manufacturer's representative present
 4. Data and time of testing
 5. Type of products or work
 6. Type of tests and results
 7. Retesting required.
- I. Verify that subcontractors maintain accurate record documents.

- J. Substitutions and Changes:
 - 1. Review proposals and requests:
 - a. Check for compliance with Contract Documents.
 - b. Verify compatibility with work and equipment for other trades.
 - 2. Recommend action
- K. Observe Work for compliance with requirements of Contract Documents.
 - 1. Maintain list of observed deficiencies and discrepancies.
 - 2. Promptly report deficiencies or discrepancies.
- L. Assemble documentation for handling of claims or disputes.
- M. Equipment Start-Up:
 - 1. Check to assure that utilities and specified connections are complete and that equipment is in operable condition.
 - 2. Observe test, adjust and balance.
 - 3. Record results, including time and date of start-up.
- N. Inspection and Acceptance of Equipment:
 - 1. Prior to inspection, check that equipment is clean, re-painted as required, tested and operational.
 - 2. Assist inspector; prepare list of items to be completed or corrected.
 - 3. Should acceptance and operation of equipment constitute the beginning of the specified guarantee period, prepare and transmit written notice.
- O. Inspection and Acceptance of Work:
 - 1. Prior to inspection, check that Work is complete and ready for acceptance.
 - 2. Assist Inspector: Prepare list of items to be complete or corrected.
 - 3. Should acceptance of Work constitute the beginning of the specified guarantee period, prepare and transmit written notice.
- P. Assemble Record Documents from subcontractors.
- Q. Submit copies of lists, tests and operating logs to Architect.

PARTS 2 AND 3 - PRODUCTS AND EXECUTION

Not Applicable

END OF SECTION 01 3113

SECTION 01-3233 – PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 WORK INCLUDED:

- A. The Contractor shall furnish the Owner/Engineer a complete, color, audio-visual record in accordance with these specifications.
- B. The Contractor shall provide all labor, equipment, and materials necessary to provide a complete audio-visual record of the construction area in accordance with this specification.
- C. The audio-visual recording shall be performed within a two (2) week period prior to staging of equipment or materials in the construction area. Deliverables shall be furnished to the Owner/Engineer a minimum of one (1) week prior to the pre-construction meeting. No equipment or material shall be placed or delivered to the construction area prior to Engineer review of the audio-visual record.
- D. The audio-visual recording shall be performed within a two (2) week period prior to staging of equipment or materials in the construction area. Deliverables shall be furnished to the Owner/Engineer a minimum of one (1) week prior to the pre-construction meeting. No equipment or material shall be placed or delivered to the construction area prior to Engineer review of the audio-visual record.
- E. The audio-visual recording shall be done during a time of good visibility. No recording shall be done during periods of visible precipitation or when more than ten percent (10%) of the ground area is covered with snow, unless authorized in writing by the Owner.
- F. The Contractor shall notify the Owner/Engineer seventy two (72) hours prior to any scheduled recording on private property. The Owner/Engineer shall notify affected property owners of scheduled recording and request permission. If permission is denied, Contractor shall ONLY perform recording from public Right-of-Ways (ROWs). The audio-visual record log shall note where permission for entry onto private property was requested and not obtained thereby limiting access to public ROWs only.

1.03 QUALITY ASSURANCE:

- A. The audio-visual record of construction area may be performed by a representative of the contractor's choosing. The result must produce a high quality color video and audio digital recording of existing conditions prior to mobilization.

1.04. INSPECTION:

- A. The audio-visual coverage shall include all surface features located within the construction zone of influence. The construction zone of influence shall be defined as follows:

1. The area within any permanent and temporary easements and the areas adjacent to these easements which may be affected by routine construction operations
 2. The area within all road ROWs and the areas adjacent to these ROWs which may be affected by routine construction operations; and
 3. As directed by the Owner/Engineer.
- B. The surface features within the construction zone of influence shall include, but not be limited to, all visible existing pavement, roadways, driveways, sidewalks, curbs, ditches, culverts, utility structures (manholes, gate wells, hydrants, catch basins, cleanouts, curb stop valves, etc.), landscaping, trees, shrubbery, fences, headwalls, retaining walls, and buildings.
- C. Of particular concern shall be the existence and location of any faults, fractures, and defects.
- D. Houses and buildings shall be identified visually by address, when visible, in such a manner that structures of the proposed system (i.e., manholes on a sewer system & gate wells and hydrants on a water system) can be located by reference. In all instances, however, location shall be identified by audio and visual means at intervals not to exceed 100 linear feet in the general direction of travel.
- E. Areas which lie within the construction zone of influence, and which are accessible by conventional wheeled vehicles shall be recorded on both sides of the ROW, easement, or street.
- F. The Owner/Engineer/Representative shall have the authority to designate areas to be added or omitted from audio-visual coverage.

1.05 PERFORMANCE:

- A. All video shall be mastered in a high resolution digital format. Recording on VHS and transferring to DVD is not permitted.
- B. To preclude the possibility of tampering or editing in any manner, all video must continuously display transparent digital information germane to the current video image. This information must be electronically incorporated through the original recording device.
- C. The date and time of recording shall be continuously displayed in the upper left corner of the video. The time information shall consist of real time hours and minutes, separated by colons (i.e. 10:38 a.m.). The date information will include the month, day and year and be placed directly below the time information (i.e. 10/5/07).
- D. Global Positioning System (GPS) location by Differential GPS Satellites shall be displayed in the bottom center of the video. GPS location shall update once per second at five (5) meter or less positional accuracy. GPS location display will be at one tenth (1/10) arcsecond longitude and one tenth (1/10) arcsecond latitude (i.e., N41°40'52.9" W83°17'30.2").
- E. Information to assist the viewer's orientation will appear directly below the GPS location display. This information should be limited to one (1) line of text and be sufficient to allow a viewer to quickly identify the general location within the project area (i.e., "Esmt between First and Second", "Main St. – North ROW", "54321 Lincoln Ave", etc.).

- F. Accompanying the video recording shall be a corresponding and simultaneously recorded audio track containing the commentary of the camera operator. The commentary shall assist in the maintenance of viewer orientation, identification of surface features, and objective description of the points of interest being shown on the video image. Of particular concern shall be the existence and location of any faults, fractures, and defects.
- G. When conventional wheeled vehicles are used, the distance from the camera lens to the ground shall be between eight (8) and ten (10) feet to ensure proper perspective. Vehicles used to perform the audio audio-visual record shall be plainly marked with Contractor name and phone number. Contractor is responsible for traffic maintenance and control.
- H. The rate of speed in the general direction of the conveyance used during recording shall not exceed forty eight (48) feet per minute. Panning and zoom rates shall be electronically or manually controlled to provide clear viewing during playback.
- I. In some instances, audio-visual coverage will be required in areas not accessible by conventional wheeled vehicles. Such coverage shall be obtained by walking or special conveyance approved by the Engineer.

1.06 DELIVERABLES:

- A. The Contractor shall furnish to the Owner/Engineer two (2) copies of the complete audio-visual record of the construction area. The complete audio-visual record of the construction area shall consist of the audio-visual record logs, the audio-visual recording of the construction area, and an edited set of the construction drawings.
- B. The audio-visual record log shall accurately catalog the contents of each DVD. A separate log shall be created for each DVD. Each log shall include the following information in the title/header section: Owner/Engineer, Project name, AEW project number, date of recording and unique DVD number. Additionally, each log shall include the following information for each individual segment:
 - 1. Reference construction drawing sheet number
 - 2. Street name, easement description, or address
 - 3. Travel direction
 - 4. Real time code indexing for each individual segment, indicating hours, minutes, and seconds to cross reference with playback equipment to locate specific points of interest on the project
 - 5. Camera viewing direction
 - 6. Starting location – description, GPS location and approximate engineering stationing.
 - 7. Ending location – description, GPS location and approximate engineering stationing.
- C. Each individual segment must be intuitively delineated using intersections, addresses, landmarks, or in the absence of more distinguishing features, GPS location display. Examples of acceptable segment delineation include:
 - 1. North Main Street ROW from Seventh Ave to Eighth Ave;
 - 2. East Oak Street ROW from DTE Corridor to County Drain;
 - 3. South Lincoln Ave ROW from 54001 Lincoln to 54999 Lincoln;
 - 4. Water Main Easement from Washington Elementary to Second Street.
- D. If GPS location display is used to delineate segments, each segment shall include no more than 500 linear feet.

- E. The audio-visual recording of the construction area shall be furnished on new, premium quality, single sided DVD(s) in individual DVD case(s). If multiple DVDs are required to furnish the audio-visual recording of the construction area, each DVD will be assigned a unique number. DVD(s) must be of an “authored” format which can be played and viewed in a consumer available DVD player and personal computer (DVD-R, MPEG-2, uncompressed). Video shall be NTSC-525 format with 525 horizontal lines per frame, 60 fields per second and 30 frames per second (fps).
- F. The DVD(s) shall have chapters, or tracks, set at five (5) minute intervals to facilitate viewer navigation.
- G. The DVD(s) must not contain any copy protection. The Owner/Engineer must be able to make copies of the recording from the DVD to VHS, Video-CD, or additional DVDs.
- H. All DVD(s) and DVD cases shall be labeled with applicable project information and be cross referenced to audio-visual record logs. Information on the label shall include:
 - 1. Unique DVD number
 - 2. Owner/Engineer
 - 3. Project name
 - 4. RDI project number
 - 5. Date of recording
 - 6. “Owner’s copy” or “Engineer’s copy”, as applicable.
- I. An edited set of the construction drawings shall include the complete engineering plan set edited by the Contractor. Edits shall consist of delineating the points of beginning and ending of each individual segment, notation of unique DVD number of each individual segment, and an arrow indicating direction of travel for each individual segment. Edits shall be legibly written in red ink.

1.07 ACCEPTANCE

- A. The Owner/Engineer/Representative shall have the authority to reject all or any portion of the audio-visual record not conforming to this specification.

END OF SECTION 01-3223

SECTION 01 4100 – REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for requirements and fees of regulatory agencies.
- B. Related Sections include permits and licenses indicated in other Sections.
- C. The General Conditions requires that Contractor obtain and pay for all construction permits. This Section includes provisions for specific permits but does not include all permits.

1.3 PERMITS

- A. Building Permit
 - 1. Contractor:
 - a. Obtain building permit from the Charter Township of Van Buren.
 - b. Permit and inspection fees and charges will be paid by the Charter Township of Van Buren
 - c. Comply with requirements and conditions of the permit.
- B. Soil Erosion and Sedimentation Control Permit
 - 1. Contractor:
 - a. Obtain SESC permit from Wayne County
 - b. Permit and inspection fees and charges will be borne by the contractor
- C. Comply with requirements and conditions of the permit, as required Permit Compliances:
 - 1. Ensure that permit has been issued prior to beginning the Work.
 - 2. Comply with requirements of permits.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 4100

SECTION 01 4535 – TESTING SERVICES FOR BURIED UTILITIES, AND SITE PROJECTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes testing services as follows:
 - 1. Testing services which will be contracted and paid for directly by the Owner and performed by an independent testing agency selected by the Owner.
 - a. Fill material from onsite and offsite.
 - b. Fine and coarse aggregate certification tests.
 - c. Bedding material certification tests.
 - d. Laboratory soil proctor tests.
 - e. Soil compaction tests.
 - f. Verification of soil bearing capacity.
 - g. Base and subbase compaction tests.
 - h. Pavement compaction tests.
 - i. Collecting and transporting soil samples to the independent testing agency's laboratory.
 - j. Laboratory soil proctor tests.
 - k. Concrete slump and air entrainment tests.
 - l. Concrete cylinder compressive strength tests.
 - m. Travel expense of the independent testing agency.
 - n. Making concrete cylinders.
 - o. Transporting cylinders to testing agency's laboratory and performing tests.
 - 2. Testing services and certifications which will not be contracted and paid for directly by Owner and should be included in the Contractor's base Bid:
 - a. Testing performed for the Contractor's convenience.
 - 3. Owner Paid Items:
 - a. The Owner may elect to inspect or test or to employ either the Engineer or an independent testing agency to test materials on the Project other than those specified herein.
 - b. The cost of this testing will be paid for by the Owner.
- B. Testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for verification of compliance with Contract Document requirements.

1.3 REFERENCES

- A. Except as herein specified or as indicated on the Drawings, the work of this Section shall comply with the following:
 - 1. AASHTO:
 - a. Provisional Standard - TP 23 Standard Test Method for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying.
 - 2. ASTM Specifications, Tests and Test Methods:
 - a. C31 – Making and Curing Concrete Test Specimens in the Field.
 - b. C33 – Specification for Concrete Aggregates Including Appendix XI.
 - c. C39 – Test for Compressive Strength of Cylindrical Concrete Specimens.
 - d. C42 – Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.
 - e. C138 – Test for Unit Weight, Yield and Air Content of Concrete.
 - f. C143 – Test for Slump of Portland Cement Concrete.
 - g. C172 – Sampling Fresh Concrete.
 - h. C173 – Test for Air Content of Freshly Mixed Concrete by the Volumetric Method.
 - i. C192 – Making and Curing Concrete Test Specimens in the Laboratory.

- j. C227 – Standard Test Method for Potential Alkali Reactivity of Cement-Aggregate Combinations (Mortar-Bar Method).
 - k. C231 – Test for Air Content of Freshly Mixed Concrete by the Pressure Method.
 - l. C289 – Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).
 - m. C295 – Standard Guide for Petrographic Examination of Aggregates for Concrete.
 - n. C567 – Unit Weight of Structural Lightweight Concrete.
 - o. C1077 – Standard Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.
 - p. D698 – Laboratory Compaction Characteristics of Soil Using Standard Effort.
 - q. D1188 – Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Paraffin-Coated Specimens.
 - r. D1556 – Density of Soil In Place by the Sand-Cone Method.
 - s. D1557 – Moisture-Density Relations of Soils and Soils Aggregate Mixture Using 10 Pound Rammer and 18-Inch Drop.
 - t. D1586 – Penetration Test and Split Barrel Sampling of Soils.
 - u. D1883 – CBR (California Bearing Ratio) of Laboratory Compacted Soils.
 - v. D2166 – Unconfined Compressive Strength of Cohesive Soil.
 - w. D2167 – Density of Unit Weight of Soil In Place by the Rubber Balloon Method.
 - x. D2922 – Density of Soil and Soil Aggregates by Nuclear Methods.
 - y. D2937 – Density of Soil in Place by Drive Cylinder Method.
 - z. D2950 – Test Methods for Density of Bituminous Concrete in Place by Nuclear Methods.
 - aa. D3666 – Minimum Requirements for Agencies Testing and Inspecting Bituminous Paving Materials.
 - bb. D3740 – Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction.
3. ACI - American Concrete Institute:
- a. 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - b. 211.1R – Report on Alkali-Aggregate Reactivity.
 - c. 301 – Specification for Structural Concrete for Buildings.
 - d. 318 – Building Code Requirements for Reinforced Concrete.
4. MDOT Standards: Michigan Cone Test for Determination of Maximum Unit Weight of Granular Soils.

1.4 TEST REQUIREMENTS

- A. In accordance with:
- 1. Laws and Regulations.
 - 2. Sections of these Specifications.
 - 3. Reference procedures and requirements.
 - 4. Pertinent standards for testing.
- B. Testing Agency Qualifications:
- 1. Approved by authorities having jurisdiction.
 - 2. Agency meeting the requirements of ASTM C1077, D3666, and D3740.
 - 3. Agency whose primary business is materials and construction testing.
 - 4. Approved by the Engineer or the Owner.
 - 5. Objective, competent and independent from the Contractor performing the work to be inspected.
 - 6. Having adequate equipment, periodically calibrated as required, to perform the special inspections.
 - 7. Employing experienced personnel educated in conducting, supervising and evaluating special inspections similar in complexity to that required for the Project.

1.5 RETESTING COSTS

- A. Retesting:
 - 1. When initial special inspections of items except soil compaction indicate noncompliance with the Contract Documents, subsequent special inspections occasioned by the noncompliance shall be performed by the same special inspection agency, and the costs thereof shall be borne by the contractor.
 - 2. Soil Compaction:
 - a. The first retesting of soil compaction shall be paid for in accordance with the provisions of the Contract Documents.
 - 3. The second and subsequent retesting for soil compaction due to noncompliance with the Contract Documents shall be performed by the same special inspection agency, and the costs thereof shall be borne by the contractor.

1.6 REPORTS

- A. Provide the Engineer's field representative and Contractor's superintendent with a draft copy of the daily report prior to leaving the Project Site each day on which testing is performed on the Site.
- B. Provide typed copies of testing agency reports, inspections, and certifications within 5 business days to:
 - 1. The Engineer's Office: One copy.
 - 2. The Contractor's Office: One copy.
 - 3. Owner: One copy

1.7 SCHEDULING TESTING

- A. Coordinate and schedule the work of the independent testing agency.
 - 1. Notify the Engineer and the independent testing agency 48 hours prior to the expected time when testing services will be required.
 - 2. Provide access to the Work as necessary for the agency to properly perform its functions.
- B. Establishing Schedule: By advance discussion with the Engineer and independent testing agency, determine the time required to perform tests and to issue findings.
- C. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes with the independent testing agency as required.
- D. Adherence to Schedule: When the independent testing agency is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the Work, all extra costs for testing attributable to the delay will be paid by the Contractor.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

3.1 TESTING REQUIREMENTS

- A. Fine and Coarse Aggregate and Bedding Material:
 - 1. Sieve test to ensure compliance with the materials specifications.
 - 2. Provide 1 test for each source of imported materials as directed by the Engineer.
- B. Fill Material from Onsite and Offsite Sources: Sieve test to ensure compliance with the materials specifications.
- C. Soil Compaction:
 - 1. Minimum Frequency of Testing:
 - a. Outside a Building Footprint: One test per 5,000 square feet of subgrade for each layer of fill.
 - b. Utility Trenches: One test for every 200 linear feet of trench length at each lift.

2. Predominately Granular Soils:
 - a. Perform necessary laboratory and field testing required to verify compaction of fill, bedding, trench backfill and structure backfill in accordance with ASTM D1557 or Michigan Code.
 - b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D1557 or Michigan Code.
 3. Predominately Cohesive Soils:
 - a. Perform necessary laboratory and field testing required to verify compaction of fill trench backfill and structure backfill in accordance with ASTM D698.
 - b. Verify the compaction of the first 12 inches of the existing subgrade below structures, utility structures, paved areas, and areas to be filled in accordance with ASTM D698.
 4. Independent testing agency shall inform the Engineer and the Contractor's onsite supervisor immediately of onsite test results.
 5. Place no additional fill in areas where compaction results do not meet Specification requirements.
- D. Concrete Testing:
1. Point of sampling and the method of securing the Samples:
 - a. Determined by the independent testing agency.
 - b. In accordance with ASTM C172.
 2. Slump Tests:
 - a. Perform slump tests in accordance with ASTM C143.
 - b. Perform 1 slump test on the Site for each truckload of concrete.
 - c. At the Engineer's request, also perform slump tests at batch plant before adding water reducer.
 - d. Perform more slump tests if deemed necessary by the Engineer.
 3. Perform 1 air-entraining test in accordance with ASTM C231 or C173 for each truckload of concrete.
 4. Test the concrete unit weight in accordance with ASTM C138 or C567, as applicable.
 5. Test the air content and fresh concrete temperature of each set of concrete cylinders.
 6. Concrete Cylinder Testing:
 - a. In accordance with ASTM C31 and C39.
 - b. Take concrete cylinder Sample set as follows:
 - 1) Once for each 150 cubic yards (or fraction thereof) of each class of concrete placed each day, nor less than.
 - 2) Once for each 2,500 square feet of sidewalk or paving surface area placed each day.
 - c. Concrete Cylinder Sample Set: Consist of 4 standard 6-inch cylinders.
 - d. Handle cylinders carefully.
 - e. Onsite Storage:
 - 1) Handle cylinders carefully.
 - 2) 12 hours, minimum, 48 hours maximum.
 - 3) Store at a temperature range of 60 to 80 degrees F and in a moist environment.
 - 4) Shield from direct sunlight and radiant heat.
 - 5) Construct heated or water bath enclosures, as applicable, if conditions require.
 - 6) Cylinder samples taken to establish adequate strength for form removal earlier than 28 days shall be cured in locations that represent the conditions under which the structural concrete will be cured.
 - f. Laboratory Curing: For duration of curing after onsite storage.
 - g. Test 1 of the cylinders at 7 days and 2 cylinders at 28 days. Save 1 cylinder as a spare.
 - h. Acceptance and evaluation of the concrete shall be based on ACI 301.
 7. Porous Concrete:
 - a. Testing Frequency: Each 150 yd³ or fraction thereof; minimum 1 set of tests for each day placement.
 - b. Field Testing:
 - 1) Sampling: Plastic concrete in accordance with ASTM C172.
 - 2) Density:
 - a) ASTM C1688/C1688M.
 - b) Acceptance - within 5 lb/ft³ of approved design density (unit weight).
 - 3) Void Content:
 - a) Plastic concrete in accordance with ASTM C1688/C1688M.
 - b) Acceptance: Not more than 2% below the specified minimum.
 - c. Concrete Cores:
 - 1) Construct a test panel for each day of production.
 - a) Use same materials and procedures as production paving.

- b) Minimum size 5 foot x 5 foot.
- 2) Up to 3 cores for each day's production or each 150 yd³ or fraction thereof or as directed.
- 3) In accordance with ASTM C42.
- 4) After minimum of 7 days analyze 1 core from the set.
 - a) Thickness:
 - (1) ASTM C174.
 - (2) Acceptance: Untrimmed samples not less than 1/2 inch specified thickness.
 - b) Void Content:
 - (1) ASTM C642.
 - (2) A New Test Method for Porosity Measurements of Portland Cement Pervious Concrete *Felipe Montes,1 Srinivas Valavala,1 and Liv M. Haselbach2; Journal of ASTM International*, January 2005, Vol. 2, No. 1.
 - (3) Acceptance: within specified range.
 - (4) Density: ASTM C642.

END OF SECTION 01 4535

SECTION 01 50 00 – TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the furnishing and installation of construction facilities as follows:
 - 1. Contractor's field offices.
 - 2. Sanitary facilities.
 - 3. Temporary heat.
 - 4. Project signs.
 - 5. Enclosures such as tarpaulins, barricades, and canopies.
 - 6. Storage areas.
 - 7. Construction Fencing to enclose proposed construction limits (Access to Dam must be maintained)

1.3 SUBMITTALS

- A. Samples: For construction project identification sign.
 - 1. Required Sample:
 - a. 11 x 17 color proofs of sign representing actual appearance of sign producer's final product.
 - b. Created by sign producer.
 - 2. Submit and obtain review and approval by Landscape Architect/Engineer prior to printing final version of vinyl.

1.4 QUALITY ASSURANCE

- A. Construction Project Identification Sign Producer Qualifications:
 - 1. Having a minimum of 3 years' experience in production of signs of specified type.

STORAGE AREAS

- B. Locations:
 - 1. The following general areas are available for storage:
 - a. Owner's approval is required for lay down and storage areas prior to property being used.
 - 2. Specific storage and construction fencing locations within the general areas:
 - a. Carefully coordinate with Owner.
 - b. Subject to approval of Owner.
- C. Protection and Restoration:
 - 1. Protect trees and shrubs in the storage areas.
 - 2. Replace grass and other vegetation disturbed or damaged in the storage areas.
 - 3. Take reasonable means to prevent spillage of fuel, oil, chemicals and similar materials.
 - 4. Clean up spills and, if necessary, remove soil and replace with uncontaminated soil to allow vegetation to be quickly reestablished.
 - 5. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
- D. Cleaning: Keep storage areas clean in accordance with Division 01 Section "Cleaning and Waste Management."
- E. Storage: Maintain in accordance with Division 01 Section "Product Storage and Handling Requirements."

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General:
 - 1. New or used.
 - 2. Adequate in capacity for the required usage.
 - 3. Provide safe conditions.
 - 4. Comply with requirements of applicable codes and standards.

2.2 UTILITIES

- A. Temporary Utilities:
 - 1. Equipment Testing:
 - a. Owner will pay utility charges for all power, water, and other utilities.
 - b. Furnish, install, remove, and pay for associated temporary equipment, piping, pumps, fuel, power distribution, and connections.
 - 2. Water:
 - a. Owner will pay for water usage charges.
 - b. Furnish, install, remove, and pay for all temporary piping, water meters, equipment and connections.
 - c. Obtain water by connection to Owner's existing water system.
 - 3. Electricity:
 - a. Owner will pay for electrical usage charges.
 - b. Furnish, install, remove, and pay for all temporary wiring, equipment switches, panels, connections and transformers.
 - c. Furnish, install, remove, and pay for area distribution boxes so located that power and artificial lighting are located at all points where required by the Work.
 - d. Obtain electrical power by connecting to Owner's existing system.
 - 4. Construction Telephones:
 - a. Arrange for installation and removal of and pay for temporary telephones.
 - b. Pay for local telephone usage charges and Contractor's long distance usage charges.
 - c. Maintain construction telephones in:
 - 1) Contractor's field office.
 - 2) Engineer's field office is not required.

2.3 FIELD OFFICES

- A. Contractor's Field Office:
 - 1. Contractor's field office shall have at least 1 outside door.
 - 2. Pay for all heat, electricity, and telephone charges.

2.4 SANITARY FACILITIES

- A. Furnish and install all required temporary toilet buildings with sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

2.5 CONSTRUCTION HEATING

- A. General:
 - 1. All heating required during the progress of the Work, prior to the installation of the permanent heating system, shall be classified "temporary heat".
 - 2. Prior to the installation of permanent heating equipment, furnish approved heaters and fuel as required.
 - 3. Keep equipment and surroundings in clean, safe condition.
 - 4. Pay all fuel bills for heat.

- B. Permanent Heating Equipment: **NONE REQUIRED**
 - 1. Notify Engineer when installed and proposed to be used to heat building interior.
 - 2. Prior to using, provide adequate means to keep internal duct and acoustic liner surfaces clean and in a like-new condition.
 - 3. Filters:
 - a. In accordance with Division 23 Section “HVAC Air Cleaning Devices.”
 - b. Securely supported at each return and exhaust air open duct end and grille.
 - c. Support filter length at required intervals to prevent filter deformation.
 - d. Replaced at intervals required to keep internal duct and acoustic liner surfaces free of construction debris and dust.
 - 4. Ductwork used by Contractor without adequate protection shall be cleaned to Engineer’s satisfaction.
- C. Temperatures:
 - 1. Except as otherwise called for, a minimum temperature of 50 degrees F and a maximum temperature of 75 degrees F in the building shall be maintained during working hours and above freezing at all other times.
 - 2. See requirements of various other Sections of these Specifications for minimum temperature to be maintained for the application of work under the various trades.
- D. Millwork: Supply adequate heating and ventilation to dry out buildings before installation of finished millwork and trim is started.

2.6 PROJECT IDENTIFICATION SIGN

- 1. Provide one (1) 4'-0" x 8'-0" vinyl project signs to be located at the direction of the Architect.
- 2. Print sign graphic on vinyl and secure to temporary fence. Text/graphics to be supplied by Architect.
- 3. The contractor shall employ a sign company to generate artwork for the sign and submit to the Architect for approval prior to fabrication.
- 4. No other signs nor any advertisements will be allowed to be displayed.

2.7 OTHER TEMPORARY CONSTRUCTION FACILITIES

- A. Furnish, install, and maintain all other temporary construction facilities necessary for proper completion of the Work.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with applicable requirements specified in:
 - 1. Division 26 – Electrical.
 - 2. Local Building Code.
- B. Maintain and operate systems to ensure continuous service.
- C. Modify and extend systems as Work progress requires.

3.2 TEMPORARY CONTROLS

3.3 REMOVAL

- A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the Work. Remove all such temporary facilities and controls as rapidly as progress of the Work will permit.

- B. Restore all areas disturbed by construction or by placement of temporary facilities per direction of Landscape Architect /Engineers per drawings and specifications.

END OF SECTION 01 5000

SECTION 01 6600 – PRODUCT STORAGE AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for the storage and protection of Products.

1.3 STORAGE AND PROTECTION

- A. Storage:
 - 1. Maintain ample way for foot traffic at all times, except as otherwise approved by Engineer.
 - 2. Repair or replace property damaged by reason of storing of material at no additional cost to Owner.
 - 3. Packaged Materials:
 - a. Delivered in original, unopened containers.
 - b. Stored until ready for use.
 - 4. Materials shall meet the requirements of these Specifications at the time that they are used in the Work.
 - 5. Store Products in accordance with Manufacturer's instructions.
- B. Protection:
 - 1. Use all means necessary to protect the:
 - a. Products of every Section before, during and after installation.
 - b. Installed work and materials of all trades.
 - 2. All materials shall be delivered, stored and handled to prevent:
 - a. The inclusion of foreign materials.
 - b. Damage by water, breakage or other causes.
 - 3. Provide weathertight storage sheds with raised floors as may be required to adequately protect those materials and Products stored on the Site which may require protection from damage by the elements.
- C. Replacements: In the event of damage, immediately make all repairs and replacements necessary to the approval of Engineer and at no additional cost to Owner.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 6600

SECTION 01 7123 - FIELD ENGINEERING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION:

- A. Provide and pay for field engineering services required including all survey work.

1.03 QUALIFICATIONS:

- A. Registered civil engineer or land surveyor, acceptable to Contractor and Owner.

1.04 SURVEY REFERENCE POINTS:

- A. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.
 - 1. Make no changes or relocation's without prior written notice to Architect.
 - 2. Report to Architect when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
 - 3. Require surveyor to replace project control points which may be lost or destroyed.
 - a. Establish replacement based on original survey control.

1.05 PROJECT SURVEY REQUIREMENTS:

- A. Establish a minimum of two permanent bench marks on the site, re-referenced to data established by survey control points. See Sheet L-1 Existing Conditions.
 - 1. Record locations, with horizontal and vertical data, on Project Record Documents.
- B. Establish lines and levels, locate and layout, by instrumentation and similar appropriate means:
- C. From time to time, verify layouts by the same methods.

1.06 RECORDS:

- A. Maintain a complete, accurate log of all control and survey work as it progresses.

1.07 SUBMITTALS:

- A. Submit name and address of Surveyor or Professional Engineer to Architect.

- B. On request of Architect, submit documentation to verify accuracy of field engineering work.
- C. Submit certificate signed by registered engineer or surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

PARTS 2 AND 3 - PRODUCTS AND EXECUTION

Not Applicable

END OF SECTION 01 7123

SECTION 01 7400 – CLEANING AND WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specifications Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes provisions for maintaining structures and the Site in a standard of cleanliness.
- B. Related Sections: In addition to standards described in this Section, comply with requirements for cleaning as described in various other Sections of these Specifications.

1.3 QUALITY ASSURANCE

- A. Inspection:
 - 1. Daily and more often if necessary.
 - 2. Conduct inspections to verify that requirements of cleanliness are being met.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Hazards Control:
 - 1. Volatile Wastes:
 - a. Store in covered metal containers.
 - b. Remove from premises daily.
 - c. Provide secondary containment for storage of hazardous materials, as required by governing authorities or agencies.
 - 2. Prevent accumulation of wastes which create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.

1.5 PROJECT CONDITIONS

- A. Cleaning and Disposal:
 - 1. Conduct operations to comply with local ordinances and anti-pollution laws.
 - 2. Not Allowed:
 - a. Burning or burying of rubbish or waste materials Onsite.
 - b. Disposal of volatile wastes in storm or sanitary sewers: Volatile wastes include, but are not limited to, mineral spirits, oil or paint thinner.
 - c. Disposal of wastes into streams or waterways.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. Compatibility:
 - 1. Compatible with the surface being cleaned.
 - 2. Recommended by the Manufacturer of the material being cleaned.
 - 3. As reviewed by Engineer.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General:
 - 1. Store Materials:
 - a. In an orderly arrangement allowing maximum access.
 - b. To allow unimpeded drainage and traffic.
 - c. Provide for the required protection of materials.
 - 2. Do not allow accumulation of scrap, debris, waste material and other items not required for construction of the Work.
 - a. Remove from Site at least each week and more often if necessary.
 - b. Provide adequate storage for materials awaiting removal.
 - 3. Observe requirements for fire protection and protection of the environment.
- B. Site:
 - 1. Daily, and more often if necessary:
 - a. Inspect the Site.
 - b. Pick up scrap, debris, and waste material; remove such items to the place designated for their storage.
 - 2. Weekly, and more often if necessary:
 - a. Inspect arrangements of materials stored on Site.
 - b. Restack or otherwise service arrangements to meet the requirements of paragraph 3.1.A.1 above.
 - 3. At all times maintain the Site in a neat and orderly condition which meets the approval of Engineer.
 - 4. Paved Surfaces: Keep clean.
 - 5. Dust Control:
 - a. Control dust on or near the Work by the application of water, chloride or other approved means.
 - b. If Contractor fails to correct unsatisfactory conditions with 24 hours after due notification:
 - 1) Owner may arrange for such work to be performed by other means.
 - 2) Pay costs.

3.2 FINAL CLEANING

- A. Definitions for Clean: The level of cleanliness generally provided by commercial building maintenance subcontractors using commercial quality building maintenance equipment and materials.
- B. Prior to Completion of the Work:
 - 1. Remove from the Site all tools, surplus materials, equipment, scrap, debris and waste.
 - 2. Conduct final progress cleaning as described in Article 3.1 above.
- C. Site:
 - 1. Unless otherwise specifically directed by Engineer:
 - a. Hose down paved areas on Site and public sidewalks directly adjacent to the Site.
 - b. Rake clean other surfaces of the grounds.
 - 2. Remove resultant debris.
- D. Buildings and Other Structures:
 - 1. Exterior:
 - a. Visually inspect exterior surfaces.
 - b. Remove traces of soil, waste material, smudges, and other foreign matter.
 - c. Remove traces of splashed materials from adjacent surfaces.
 - d. If necessary, to achieve a uniform degree of exterior cleanliness, hose down the exterior surface.
 - e. In the event of stubborn stains not removable with water, Engineer may require light sandblasting or other cleaning at no additional cost to Owner.
 - 2. Interior:
 - a. Visually inspect interior surfaces.
 - b. Remove traces of soil, waste material, smudges and other foreign matter.
 - c. Remove traces of splashed materials from adjacent surfaces.
 - 3. Glass: Clean glass inside and outside.

- E. Timing: Schedule final cleaning as approved by Engineer to enable Owner to accept a completely clean Project.

3.3 OWNER OCCUPANCY PRIOR TO SUBSTANTIAL COMPLETION AND ACCEPTANCE

- A. If Owner occupies the Work, or a portion of the Work, prior to Substantial Completion and acceptance, then the responsibilities for interim and final cleaning shall be determined by Engineer in accordance with the Contract Documents.

END OF SECTION 01 7400

SECTION 01 7700 – CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the instructions for and the responsibilities of each party in contract closeout.
- B. Related Section includes Certificate of Substantial Completion.

1.3 SUBSTANTIAL COMPLETION

- A. Contractor: When Contractor considers that the Work or any portion of the Work is ready for its intended use, Contractor shall submit:
 - 1. Written certification to Engineer and Owner that the Work, or designated portion of the Work, is substantially complete.
 - 2. A list of major items to be completed or corrected.
 - 3. Request that Engineer issue a certificate of Substantial Completion.
- B. Engineer's Inspection: Engineer will make an inspection:
 - 1. Within 10 days after receipt of certification.
 - 2. Together with Owner and Contractor.
- C. Engineer's Determination of Substantial Completion:
 - 1. Should Engineer consider the Work or designated portion of the Work substantially complete, the following steps shall be taken:
 - a. Contractor shall prepare and submit to Engineer, a list of items to be completed or corrected as determined by the inspection.
 - b. Engineer will prepare and deliver to Owner:
 - 1) A tentative certificate of Substantial Completion.
 - 2) A tentative list of items to be completed or corrected before final payment.
 - c. Owner shall have 7 days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list.
 - d. Engineer will, within 14 days after delivery of tentative certificate to Owner, decide:
 - 1) Not Substantially Complete: Engineer will issue written notice to Contractor stating reasons.
 - 2) Substantially Complete: Engineer will issue definitive certificate of Substantial Completion and a revised list of items to be corrected or completed.
 - 2. Should Engineer consider that the Work or designated portion of the Work is not substantially complete, the following steps shall be taken:
 - a. Engineer shall notify Contractor in writing stating Engineer's reasons.
 - b. Contractor shall complete the Work and send a second written notice to Engineer certifying that the Project, or designated portion of the Project, is substantially complete.
 - c. Engineer and Owner will reinspect the Work.
- D. Division of Responsibilities:
 - 1. Engineer:
 - a. At the time of delivery of tentative certificate of Substantial Completion.
 - b. Deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment with respect to:
 - 1) Security.
 - 2) Operation.
 - 3) Safety.
 - 4) Protection of the Work.

- 5) Maintenance.
 - 6) Heat.
 - 7) Utilities.
 - 8) Insurance.
 - 9) Warranties.
2. Engineer's written recommendation on division of responsibilities shall be binding on Owner and Contractor until final payment unless Owner and Contractor agree otherwise in writing and so notify Engineer prior to Engineer's issuance of a definitive certificate of Substantial Completion.

1.4 FINAL INSPECTION

- A. Contractor Certification: Prior to final inspection, Contractor shall submit written certification that:
1. The Contract Documents have been reviewed.
 2. The Project has been inspected in compliance with the Contract Documents.
 3. Work has been completed in accordance with the Contract Documents.
 4. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 5. The Project is complete and ready for final inspection.
- B. Engineer's Inspection: The Engineer will make final inspection:
1. Within 10 days after receipt of certification.
 2. Together with Owner and Contractor.
- C. Engineer's Determination of Final Completion:
1. Should Engineer consider the Work complete and ready for final payment in accordance with the requirements of the Contract Documents, Engineer shall request Contractor to make Project closeout submittals.
 2. Should Engineer consider the Work not complete and ready for final payment:
 - a. Engineer shall notify Contractor in writing stating the reasons.
 - b. Contractor:
 - 1) Take immediate steps to remedy the stated deficiencies.
 - 2) Send a second written notice to Engineer certifying that the Work is complete.
 - c. Engineer and Owner will reinspect the Work.

1.5 REINSPECTION COSTS

- A. Should Engineer be required to perform second inspections because of failure of the Work to comply with the original certifications of Contractor, Owner will compensate Engineer for additional services and deduct the amount paid from payment or payments to Contractor.

1.6 ADDITIONAL INSPECTION COSTS

- A. Substantial Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of Substantial Completion and the actual date of Substantial Completion and deduct the amounts paid from payment or payments to Contractor.
- B. Final Completion: Owner will compensate Engineer for inspection services rendered between the scheduled date of final completion and the actual date of final completion and deduct the amounts paid from payment or payments to Contractor.

1.7 CLOSEOUT SUBMITTALS

- A. Contractor:
1. Provide closeout submittals as required in the Contract Documents.
 2. These submittals shall include, but not necessarily be limited to:
 - a. Project record documents.
 - b. Operation and maintenance manuals.
 - c. Manufacturer's Warranties and Guarantees.
 - d. Spare parts and maintenance materials.

- e. Instruction in operation of all systems.

1.8 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

- A. Affidavits:
 - 1. Submit with final Application for Payment an affidavit of payment of debts and release of claims.
 - 2. Affidavit shall include:
 - a. Contractor's release or waiver of lien.
 - b. Sub-Contractor's final waiver of lien
 - c. Consent of surety of final payment.
- B. Execution: All submittals shall be duly executed before delivery to Engineer.

1.9 FINAL ADJUSTMENT OF ACCOUNTS

- A. Final Statement: Submit a final statement of accounting, which reflects all adjustments, to Engineer. This statement shall contain the following:
 - 1. Original Contract Price.
 - 2. Additions and deductions.
 - 3. Total Contract Price as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- B. Final Change Order: Engineer will prepare a final Change Order reflecting approved adjustments to the Contract Price not previously made by Change Orders.

1.10 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit a final Application for Payment in accordance with the requirements of the Contract Documents.
- B. Disposition of Final Application for Payment:
 - 1. If the final Application for Payment and the Work are acceptable in accordance with the Contract Documents:
 - a. Engineer will, within 10 days after receipt of the Application for Payment:
 - 1) Submit to Owner a written recommendation for payment.
 - 2) Submit to Owner and Contractor a written notice that the Work is acceptable subject to the provisions of the General Conditions.
 - b. Owner will, within 30 days after receipt of the Application for Payment and Engineer's recommendation in accordance with the Contract Documents, pay to Contractor the amount recommended.
 - 2. If the Application for Payment, the Work or both are unacceptable:
 - a. Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment.
 - b. Contractor shall make the necessary corrections and resubmit the Application for Payment.
 - 3. Final Completion Delayed:
 - a. Upon receipt of Contractor's final Application for Payment and recommendation by Engineer, Owner shall make payment of the balance due for that portion of the Work fully completed and accepted if Engineer confirms that final completion of the Work is significantly delayed through no fault of Contractor.
 - b. Payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
 - c. Contractor shall submit with the Application for Payment written consent of surety if the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION 01 77 00

SECTION 02 4113 – SELECTIVE SITE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 WORK INCLUDED:

- A. Provide all labor, materials, necessary equipment and services to complete the site demolition work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".
- B. Related work specified elsewhere:
 - 1. Section 03 3300 Concrete Paving
 - 2. Section 31 2200: Grading
 - 3. Section 31 2500: Erosion and Sedimentation Control
 - 4. Section 32 1216: Asphalt Paving

1.03 QUALITY ASSURANCE:

- A. Contractor Qualifications: Minimum of five years experience in demolition of comparable nature.
- B. Requirements of All Applicable Regulatory Agencies:
 - 1. All applicable Building Codes and other Public Agencies having jurisdiction upon the work.

1.04 SUBMITTALS:

- A. Permits and notices authorizing demolition if applicable.
- B. Certificates of severance of utility services.
- C. Permit of transport and disposal of debris.
- D. Demolition procedures and operational sequence for review and acceptance by Landscape Architect.

1.05 JOB CONDITIONS:

- A. Protection:
 - 1. Erect barriers, fences, guard rails, enclosures and shoring to protect personnel, structures and utilities remaining intact.
 - 2. Protect designated trees and plants from damages.

3. Use all means necessary to protect existing objects and vegetation designated to remain, and, in the event of damage, immediately make all repairs, replacements and dressing to damaged plants necessary to the approval of the Architect at no additional cost to the Owner.
- B. Maintaining Traffic:
1. Ensure minimum interference with roads, streets, driveways, sidewalks and adjacent facilities.
 2. Do not close or obstruct streets and sidewalks, and keep in operation throughout construction.
 3. If required by governing authorities, provide alternate routes around closed or obstructed traffic ways.
- C. Dust Control:
1. Use all means necessary for preventing dust from demolition operations from being nuisance to adjacent property owners. Methods used for dust control are subject to approval by the Architect prior to use.
- D. Burning:
1. On-site burning will not be permitted.

PART 2 - PRODUCTS "NOT APPLICABLE"

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Before beginning work of this section, inspect areas in which work will be performed.
- B. Photograph or video existing conditions, including surrounding property if necessary, which could be misconstrued as damage resulting from selective demolition. File copies of photographic documentation with the Architect before beginning work of this Section.
- C. Do not commence work until all conditions and requirements of all applicable public agencies are complied with.

3.02 PREPARATION:

- A. Arrange for and verify termination of utility services to include removing meters and capping lines as required to perform work described in the specification sections.
- B. Notification:
 1. Notify the Owner at least three full working days prior to commencing the work of this Section.

3.03 CLARIFICATION:

- A. The drawings do not purport to show all objects existing on the site.
- B. Before commencing the work of the Section, verify with the Owner all objects to be removed and all objects to be preserved.

3.04 SCHEDULING:

- A. Schedule all work in a careful manner with all necessary consideration for the public and the Owner.
- B. Avoid interference with the use of, and passage to and from, adjacent facilities.

3.05 DISCONNECTION OF UTILITIES:

- A. Before starting site operations, disconnect or arrange for the disconnection of all utility services designated to be removed, performing all such work in accordance with the requirements of the utility company or agency involved.

3.06 PROTECTION OF UTILITIES:

- A. Preserve in operating condition all active utilities adjacent to or traversing the site and/or designated to remain.

3.08 OTHER DEMOLITION (IF APPLICABLE):

- A. Pull out any existing utility lines designated for abandonment, irrigation, electrical lines, pull boxes and splice boxes, man holes and catch basins to be removed and all other objects designated to be removed or interfering with the work. Contact the utility company or agency involved for their requirements for performing this work. All removed equipment and materials shall be removed from the work area the same day as removed.
- B. Removal of Debris: Remove all debris from the site and leave the site in a neat, orderly condition to the full acceptance of the Landscape Architect, or the Owner. No debris shall be left on the site overnight.

END OF SECTION 02 4113

SECTION 03 3300 – CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and General and Supplemental Requirements. Which are hereby made a part of this section.

1.02 WORK INCLUDED:

- A. Provide all labor, materials, necessary equipment, and services to complete the Fine Grading work, as indicated on the drawings, as specified herein or both

B. Related work specified elsewhere:

1. Section 05 5213: Pipe and Tube Railings
2. Section 31 2200: Grading
3. Section 32 0515: Soils for Exterior Improvements
4. Section 32 8423: Underground Sprinklers
5. Section 32 9219: Seeding (Alternate 1)
6. Section 32 9223: Sodding (Base Bid)

C. REFERENCES

D. American Concrete Institute (ACI)

1. ACI 301 - Specifications for Structural Concrete.
2. ACI 302 - Guide for Concrete Floor and Slab Construction.
3. ACI 304 - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
4. ACI 305R - Hot Weather Concreting.
5. ACI 306R - Cold Weather Concreting.
6. ACI 308 - Standard Specification for Curing Concrete.
7. ACI 318 - Building Code Requirements for Structural Concrete (ACI 318-05) and Commentary.

ASTM International. For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For Annual Book of ASTM Standards volume information, refer to the standard's Document Summary page on the ASTM website.

1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
2. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
3. ASTM A775 - Standard Specification for Epoxy-Coated Steel Reinforcing Bars
4. ASTM B221 - Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
5. ASTM C33 - Concrete Aggregates.
6. ASTM C94 - Ready-Mixed Concrete.
7. ASTM C150 - Portland Cement.

8. ASTM C260 - Air Entraining Admixtures for Concrete.
 9. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.
 10. ASTM C494 - Chemicals Admixtures for Concrete.
 11. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type).
 12. ASTM D1190 - Concrete Joint Sealer, Hot-Poured Elastic Type.
 13. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).
- E. Concrete Reinforcing Steel Institute (CRSI)
1. Manual of Standard Practice
- F. Michigan Department of Transportation - MDOT
1. 2012 MDOT Standard Specifications for Construction, or current issue
- G. Americans with Disabilities Act (ADA)

1.03 DESCRIPTION

- A. Provide all materials, labor, equipment, and services necessary to complete the concrete improvements as indicated in the Construction Documents.

1.04 QUALITY ASSURANCE

- A. Installer shall be qualified with at least 3 years in business and has completed pavement work similar in material, design, and extent to that indicated for this Project.
- B. Manufacturer shall be certified in the production of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
- C. Submit concrete mix designs for proposed slabs on grade.
- D. Submit shop drawings and certified copies of mill report of reinforcement materials analysis if specified.
- E. Concrete quality assurance testing, as required, will be performed by the owner/construction engineer in accordance with Sections 604 and 605 of the 2012 MDOT Standard Specifications for Construction, or current issue.
- F. Submit, to the Owner, two copies of materials certificates signed by Material Producer and Contractor. Certificates shall state that each material item meets specified requirements.
- G. Submit, to the Owner, job-mix formulas for each required cement-aggregate mixture. Mix designs shall be within allowable tolerances as specified for the application.

1.05 TRAFFIC CONTROL

- A. Maintain vehicle and pedestrian traffic during paving and repair operations in such a manner as to not disrupt normal traffic activities unless special notification has been distributed.

1.06 WEATHER LIMITATIONS

- A. Construct pavement surface course only when ground temperature is above 40 degrees F. and base is dry. Base course may be laid when temperature is above 40 degrees F. and rising. Do not place pavement when base or surface is wet or frozen.
- B. Cold Weather Protection: When the temperature of the atmosphere is 40-degrees F. and below, the concrete shall be protected by heating, insulation covering, housing or combination thereof as required to maintain the temperature of the concrete at or above 50-degrees F. and in a moist condition continuously for the concrete curing period. Cold weather protection shall meet the requirements of ACI 306R "Cold Weather Concreting."
- C. Hot Weather Protection: When the temperature of the atmosphere is 90-degrees F. and above, or during other climatic conditions which will cause too rapid drying of the concrete, the concrete shall be protected by windbreaks, shading, fog spraying light-colored moisture-retaining covering, or a combination thereof as required to maintain the temperature of the concrete below 80-degrees F. and in a moist condition continuously for the concrete curing period. Hot weather protection shall meet the requirements of ACI 305R "Hot Weather Concreting."

1.07 SUBMITTALS

- A. Concrete Mix Designs
 - 1. Prior to any concrete pavement placement, the contractor shall submit a design mix for approval by the engineer for each pavement mix proposed. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
 - 2. Proportion mixes to provide concrete for pavement and gutter and spillways with the following properties.
 - a. Compressive Strength (28 days): 3,500 psi, unless otherwise indicated
 - b. Maximum Aggregate Size: 1.5 inches
 - c. Slump: 3 inches
 - d. Total Air Content by Volume: 5%

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All materials used in concrete pavement shall be in accordance with Section 801.02 of the MDOT 2012 Standard Specifications for Construction.

- B. The fine aggregate shall meet all requirements of the MDOT 2012 Standard Specification, or current issue for No. 2NS Natural Sand.
- C. The coarse aggregate shall meet of requirements of the MDOT 2012 Standard Specification for No. 6AA Coarse Aggregate.
- A. Water used in concrete shall be clean, free from oil, acids strong alkalies or vegetable matter and potable. If City water is used in the concrete, all necessary permits shall be obtained from the City Water Department.
- B. Joint and waterproofing materials for use in concrete pavement shall conform to Section 904 of the MDOT 2003 Standard Specifications for Construction
- C. The curing compound shall be white membrane type and conform with ASTM C-309, Type 2.

2.02 READY-MIXED CONCRETE MANUFACTURER'S QUALIFICATIONS

- A. All ready-mixed concrete suppliers must be approved by the Owner. Concrete shall be manufactured and delivered to the job Site by a ready-mixed concrete manufacturer meeting the requirements of the National Ready Mixed Concrete Association (NRMCA) certification program.

2.03 READY-MIXED CONCRETE

- A. All production, handling of materials, and distribution of ready-mixed concrete shall meet the requirements set forth in Section 601 of the MDOT 2003 Standard Specifications for Construction.
- B. Ready-mixed concrete shall be mixed and delivered to the point of discharge at the job by means of a ready-mix concrete truck. Delivery tickets in accordance with Section 16 of ASTM C94 for each concrete load delivered to and used at the site shall be signed by the owner's designated representative. The delivery tickets shall provide at minimum the following information:
 - 1. Date
 - 2. Name of ready-mix concrete plant
 - 3. Contractor
 - 4. Job location
 - 5. Type (Standard or H.E.S.) and brand of cement
 - 6. Cement content in bags per cubic yards of concrete
 - 7. Truck number
 - 8. Time dispatched and time unloaded
 - 9. Amount of concrete in load in cubic yards
 - 10. Admixtures in concrete
 - 11. Maximum allowable slump in inches
 - 12. Amount of water added at job in gallons if any

- B. No water from the truck water system or elsewhere shall be added after the initial introduction of the mixing water for the batch. Under no circumstances shall the approved maximum water content be exceeded, nor shall the slump exceed the maximum specified.
- C. Discharge of the concrete shall be completed in compliance with Table 601-1 of the MDOT 2012 Standard Specifications for Construction.
- D. Concrete delivered in cold weather (air temperature 45-degrees F. and lower) shall have a temperature not less than 60-degrees F. at the point of discharge at job, and in compliance with ACI 306 R "Cold Weather Concreting". Concrete placing will not be permitted when the air temperature is 35-degrees F. or lower.
- E. Concrete delivered under hot weather conditions contributing to quick stiffening of concrete, or in air temperature of 80-degrees F. and over, shall have a temperature between 60- and 80-degrees F. at the point of discharge at job, and in accordance with ACI 305 R "Hot Weather Concreting."

2.04 REINFORCEMENT MATERIALS

- A. Reinforcing Bars: ASTM A615-84A, Grade 60 Deformed Billet-Steel Bars, if specified.
- B. Epoxy-Coated Reinforcement Bars: ASTM A775 with ASTM A615, Grade 60, deformed bars, if specified.
- C. Plain Steel Welded Wire Fabric: ASTM A185 plain type, flat sheet fabrication, if specified.
- D. Reinforcing Steel Bar and Rod Mats: ASTM A704, ASTM A615, Grade 60, deformed bars, if specified.
- E. Epoxy-Coated Joint Dowel Bars: ASTM A615 with ASTM A615, Grade 60, plain steel bars.
- F. Hook Bolts per ASTM A307, Grade A, internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt, if specified.
- G. Tie Wires to be black, annealed steel wire, not less than 16-gauge.
- H. Supports for Reinforcements: Bar supports conforming to "Bar Support Specifications" contained in ACI "Manual of Standard Practice". Provide chairs, spacers, and other devices suitable for proper spacing, supporting and fastening reinforcing bars, if specified
- I. Shop fabricate reinforcing bars to conform to the shapes and dimensions shown on the reviewed Shop Drawings and in accordance with ACI "Manual of Standard Practice," current edition.

2.06 FORMS

- A. All forms shall extend 1” deeper than full depth of the proposed pavement section and cleaned before each use.
- B. Fixed forms shall be of sufficient strength to resist springing during concrete-placing operations, and of an approved section with flat surface on top.
- C. Flexible form materials may consist of plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
- D. A commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces shall be applied to the forms before concrete installation.

PART 3- EXECUTION

3.01 GRADING

- A. All new pavement shall be placed on a prepared subgrade, smoothed, and leveled to the grades indicated on the Plans.
- B. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction and repair as required. In clay soils the subgrade shall be excavated 4 inches below the sidewalk base and filled with approved sand meeting MDOT Class II granular fill.

C. SETTING FORMS

- A. Compact and cut-to-grade subgrade under forms so that forms when set will be uniformly supported for the entire length. Securely stake and brace or tie forms to prevent leakage of concrete. Bracing with piles of earth will not be permitted.
- B. Coat surfaces of forms to be in contact with concrete with a light clear paraffin oil or parting compound which will not stain the concrete.
- C. Before start of concrete placing, form Work shall be complete and approved by the Soils Engineer.
- D. Hardened concrete, debris and foreign material shall be removed from interior of forms.

3.02 PLACING REINFORCEMENT

- A. Provide reinforcement for concrete slabs on grade as shown on the Drawings. Reinforcement shall be kept clean and free from objectionable rust. Bends or kinks in reinforcing bars shall be corrected before placing. All reinforcement shall be accurately located in forms and securely held in place, before and during concrete placing, by supports adequate to prevent displacement during the course of construction.

- B. Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

3.03 CONTRACTION JOINTS

- A. Provide contraction joints in concrete sidewalk T/4 inch deep by 3/16 inches wide at 5 foot intervals, unless a more detailed jointing pattern is called for.
- B. For other contraction joints form by tooling or sawing a 1/4 inch wide joint T/4 inches deep. In no case shall the joints be greater than 10 feet in any direction. Joints shall be cut perpendicular to the surface and at right angles to the edge of pavement, unless a more detailed jointing pattern is called for.

3.04 EXPANSION (OR ISOLATION) JOINTS

- A. Provide expansion joints for concrete sidewalks and ramps at tangent points, radius returns, at intersections, and in straight runs at uniform intervals not exceeding 25-30 linear feet.
- B. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler.
- C. Provide expansion joints between concrete pavement and adjacent rigid structures not specified herein before.

3.05 CONCRETE PLACING

- A. Thickness of concrete slabs vary. See plans
- B. Concrete shall be handled from the point of delivery and to concrete conveying equipment, and to the location of final deposit by methods, which will prevent segregation and loss of concrete mix materials and in a manner, which will assure that the required quality of concrete is maintained.
- C. Before placing pavement, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- D. Cold-Weather concrete placement shall comply with ACI 306.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.
- E. Hot-Weather concrete placement shall be according to recommendations in ACI 305R when hot-weather conditions exist.

- F. Equipment for Conveying Concrete:
 - 1. Runways for wheeled concrete conveying equipment shall be provided for the ready-mix concrete delivery point to the locations of final deposit.
 - 2. The interior surfaces of concrete conveying equipment shall be maintained free of hardened concrete, debris, water, snow, ice, and other deleterious materials.
- A. When the temperature of steel forms is greater than 120-degrees F., the steel surfaces shall be sprayed with water just prior to placing the concrete.
- B. Concrete shall be deposited continuously. Concrete which has partly hardened or has been contaminated by foreign materials shall not be placed; such concrete shall be properly disposed of in an approved manner.
- C. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.

3.06 CONCRETE FINISHING

- A. Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.
- B. Float pavement surface by hand floating. Cut down high spots and fill low spots.
- C. Apply a light broom finish perpendicular to direction of travel.

3.07 CURING CONCRETE

- A. Apply curing compound uniformly in continuous operation by power spray.
- B. Newly placed concrete shall be protected as required to maintain the temperature of the concrete at not less than 50 degrees F. nor more than 80 degrees F. and in a moist condition continuously for a period of time necessary for the concrete to cure. Changes in temperature of the concrete during curing shall be as uniform as possible and shall not exceed 5 degrees F. in any one hour, nor 50 degrees F. in any 24 hour period.

3.08 REMOVAL OF FORMS

- A. All forms, rails and stakes shall be removed within 48-hours after placing the pavement.
- B. Any and all "honey combing" noticed upon removal of the forms shall be hand grouted.
- C. Upon removal of the forms, the remaining excavated area shall be backfilled with approved material, compacted thoroughly, and left in a neat condition.

3.09 CLEANUP

- A. After completion of concrete curing in an area, remove all weather protection materials and rubbish and debris resulting from specified Work. Sweep concrete pavements clean.
- B. In no case shall the mixer or truck be flushed out onto the street pavement, in a catch basin or sewer manhole, or in any public right-of-way.

END SECTION 03 3300

SECTION 05 5213– PIPE AND TUBE RAILINGS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of handrails and railings is shown on drawings.
- B. Types of handrails and railing systems required include:

- 1. Aluminum pipe and tube handrails

1.03 SYSTEM PERFORMANCE REQUIREMENTS:

- A. Structural Performance of Handrails and Railing Systems: Design, engineer, fabricate and install handrails and railing systems to withstand the following structural loads without exceeding the allowable design working stress of the materials for handrails, railing systems, anchors and connections. Apply each load to produce the maximum stress in each of the respective components comprising handrails and railing systems.

- 1. Handrails Not Serving as Top Rails: Capable of withstanding the following loads applied as indicated:

- a. Concentrated load of 200 lbs. applied at any point non-concurrently, vertically downward or horizontally.
- b. Uniform load of 50 lbs. per linear ft. applied non-concurrently, vertically downward or horizontally.
- c. Concentrated and uniform loads above need not be assumed to act concurrently.

1.04 SUBMITTALS:

- A. Product Data: Manufacturer's technical data for products and processes used in handrails and railing systems, including finishes and grout.
- B. Shop Drawings: Show details of fabrication and installation for each type and material of handrail and railing system required including plans, elevations, sections, profiles of rails, fittings, connections and anchors.
 - 1. Provide templates for anchor and bolt installation by others.
 - 2. Include structural computations evidencing compliance of handrails and railing systems with design loadings indicated.
- C. Samples: Prepare samples of each type of metal finish required on metal of same thickness and alloy indicated for final work. Where finish involves normal color and texture variations,

include sample sets composed of two or more units showing limits of such variations expected in completed work.

1. Include 6" long samples of each distinctly different railing member including handrails, top rails, posts and balusters. Include samples of fittings and brackets.
2. Sample need not be full height.

1.05 QUALITY ASSURANCE:

- A. Single Source Responsibility: Obtain handrails and railing systems of each type and material from a single manufacturer.
- B. Design Responsibility: Engage a qualified professional engineer to prepare or supervise the preparation of structural computations for handrails and railing systems to determine compliance with structural performance requirements indicated.
 1. Engineer Qualifications: A professional engineer who is licensed to practice in jurisdiction where Project is located and who is experienced in providing structural engineering service of the kind required for work of this section.

1.06 STORAGE:

- A. Store handrails and railing systems in clean, dry location, away from uncured concrete and masonry, protected against damage of any kind. Cover with waterproof paper, tarpaulin or polyethylene sheeting; allow for air circulation inside the covering.

1.07 PROJECT CONDITIONS:

- A. Field Measurements: Verify handrail and railing dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.05 COORDINATION

- A. Coordinate installation of anchorages for handrails and railings. Furnish setting drawings templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

- A. Manufacturer: Subject to compliance with requirements, provide handrails and railing systems of one of the following:
 1. Aluminum Pipe and Tube Railings:
 - a. Great Lakes Metal Fabrication
 - b. Casco & Sons LLC
 - c. R&B Wagner, Inc
 - d. Superior Aluminum Products, Inc.
or approved substitute

2.02 METALS:

- A. General: Comply with standards indicated for forms and types of metals indicated or required for handrail and railing systems components.
- B. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than the strength and durability properties of alloy and temper designated below for each aluminum form required.
 - 1. Extruded Bar and Tube: ASTM B 221 (ASTM B 221M), alloy 6063-T5/T52.
 - 2. Extruded Structural Pipe and Tube: ASTM B 429, alloy 6063-T6.
 - 3. Drawn Seamless Tube: ASTM B 210 (ASTM B 210M), alloy 6063-T832.
 - 4. Plate and Sheet: ASTM B 209 (ASTM B 209M), alloy 6061-T6.
 - 5. Die and Hand Forgings: ASTM B 247 (ASTM B 247M), alloy 6061-T6.
 - 6. Castings: ASTM B 26 (ASTM B 26M), alloy A356-T6.

2.04 MISCELLANEOUS MATERIALS:

- A. Nonshrink Nonmetallic Grout: Pre-mixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.
- B. Welding Electrodes and Filler Metal: Provide type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, as required for color match, strength and compatibility in fabricated items.
- C. Fasteners for Interconnecting Handrail and Railing Components: Use fasteners fabricated from same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
 - 1. Provide concealed fasteners for interconnecting handrail and railing components and for attaching them to other work, unless otherwise indicated.
 - 2. Provide concealed fasteners for interconnecting handrail and railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for handrails and railings indicated.
 - 3. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.

2.05 FABRICATION:

- A. General: Fabricate handrails and railing systems to design, dimensions and details shown. Provide handrail and railing members in sizes and profiles indicated, with supporting posts and brackets of size and spacing shown, but not less than required to comply with requirements indicated for structural performance.

- B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- C. Welded Connections: Fabricate handrails and railing systems for interconnections of members by welding. Use welding method which is appropriate for metal and finish indicated and develops strength required to comply with structural performance criteria. Finish exposed welds and surfaces smooth, flush and blended to match adjoining surfaces.
- D. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain profile of member throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of handrail and railing components.
- E. Nonwelded Connections: Fabricate handrails and railings by connecting members with concealed mechanical fasteners and fittings, unless otherwise indicated. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
- F. Brackets, Flanges and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors for interconnection of handrail and railing members to other work, unless otherwise indicated.
- G. Field measure and core drill existing installed concrete 4 inches deep x required diameter to accept handrails posts.
- H. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- I. Ease exposed edges to a radius of approximately $\frac{1}{32}$ " (1 mm), unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work.

2.06 METAL FINISHES - GENERAL:

- A. Comply with NAAMM "Metal Finishes Manual" for recommendations and designations of finishes, except as otherwise indicated.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Provide any exposed fasteners with finish matching appearance, including color and texture, of handrails and railings.

2.08 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.
- B. Mechanical Finish: AA-M12 (Mechanical Finish: nonspecular as fabricated).
- C. Class I, Clear Anodic Finish: AA-M12C22A41 Anodic Coating: Architectural Class I, clear anodized coating 0.018 mm or thicker) complying with AAMA 607.1.

PART 3 – EXECUTION

3.01 EXAMINATION:

- A. Installer must examine the areas and conditions under which handrails and railings are to be installed and notify the General Contractor in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

3.02 PREPARATION:

- A. Coordinate setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as sleeves, concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete as masonry construction. Coordinate delivery of such items to project site.
- B. Field Measurements: Take field measurements prior to fabrication.

3.03 INSTALLATION, GENERAL:

- A. Fit exposed connections accurately together to form tight, hairline joints.
- B. Perform cutting, drilling and fitting required for installation of handrails and railing systems. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Do not weld, cut or abrade surfaces of handrails and railing components which have been coated or finished after fabrication and are intended for field connection by mechanical means without further cutting or fitting.
- C. Field Welding: Comply with applicable AWS specification for procedures of manual shielded metal-arc welding, for appearance and quality of welds made, and for methods used in correcting welding work. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed welded joints smooth and restore finish to match finish of adjacent rail surfaces.
- D. Adjust handrails and railing systems prior to anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated but not less than that required by design loadings.

3.04 ANCHORING POSTS:

- A. Concrete-Anchored Posts: Insert posts into cores in concrete and fill annular space between posts and sleeve solid with nonshrink, nonmetallic grout, mixed and placed to comply with grout manufacturer's directions. Set posts plumb within a tolerance of 1/16" in 3 feet.
- B. Cover anchorage joint with flange of same metal as post, attached to post as follows:
 - 1. By set screws.

3.05 RAILING CONNECTIONS:

- A. Welded Connections: Use fully welded joints for permanently connecting railing components by welding. Cope or butt components to provide 100 percent contact or use manufacturer's standard fittings designed for this purpose.
- B. Align rails so variations from level for horizontal members and from parallel with rake of steps and ramps for sloping members do not exceed 1/4" in 12'.

- C. Expansion Joints: Provide expansion joints at locations indicated or, if not indicated, at intervals not to exceed 40 feet. Provide slip-joint interval sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side, locate joint within 6" of post.

3.07 ADJUSTING:

- A.. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.
- B. Adjust handrails and railings before anchoring to ensure matching alignment at abutting joints. Space posts at interval indicated, but not less than that required by structural loads.

3.08 CLEANING

- A. Clean aluminum by washing thoroughly with clean water and soap and rinsing with clean water.

3.09 PROTECTION:

- A. Protect finishes of railing system and handrails from damage during construction period by use of temporary protective coverings approved by railing manufacturer. Remove protective covering at time of Substantial Completion.
- B. Restore finished damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

END OF SECTION 05 5200

SECTION 07 9200 - JOINT SEALANTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 WORK INCLUDED:

- A. Provide all labor, materials, necessary equipment and services to complete the Joint Sealants work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".
- B. Related work specified elsewhere:
1. Section 03 3300: Cast-in-Place Concrete
 2. Section 05 5213: Pipe and Tube Railings

1.03 SAMPLES AND CERTIFICATES:

- A. Submit the following samples:

<u>Quantity</u>	<u>Size</u>	<u>Description</u>
3	6" long	Filler for polyurethane
3	Color sample charts	Polyurethane sealants

- B. Submit the following Certificates for Compliance:

<u>Description</u>	<u>Standards</u>
Polyurethane (two components)	Per Specifications (TT-S-00227E, Type Class A ASTM C 920, TYPE M, Grade P, Class 25

1.04 COOPERATION:

- A. Work of this section shall be provided and coordinated as required through procedures of construction that will insure safety.

1.05 GUARANTEE:

- A. Furnish written guarantee for all sealant work stating that said work shall be free from any defects of material and/or workmanship for a period of five (5) years, commencing on the date of final completion and acceptance.
- B. Said guarantee shall further state that sealants are guaranteed against:
1. Adhesive or cohesive failure of sealants in joints where movement is under maximum of $\pm 25\%$ extension or $\pm 25\%$ compression for two component polyurethane base sealant.
 2. Any crazing greater than 3 mils in depth developing on the surface of the sealant material
 3. Any staining of the surfaces adjacent to the joints, by the sealants, primers or joint filler materials, by migration through the adjacent materials in contact with them.

4. Any puncture, abrasion or tear failure due to pedestrian or vehicular traffic in self-leveling polyurethane base sealant installed at traffic surfaces.
5. Any visible chalking or color change on the cured surface of the sealant.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURER'S AND MATERIALS:

- A. Multi component chemically curing, polyurethane base sealant shall be manufactured to meet the specified requirements by the following manufacturer:
 1. Tremco Corp., Contact: Construction Technical Services, telephone (216) 292-5000, Fax (216) 766-5535.
 2. Sika Corporation, Telephone (201) 933-8800. Fax (201) 993-9379.
- B. Manufacturer's label shall indicate the expiration date of use of sealants or manufacturer shall otherwise attest to the date of manufacture. The period of time lapsed shall be not loner than six (6) months for polyurethane from the date of manufacturer to the date of usage on the job.
- C. Primers where required shall be as recommended by the sealant manufacturer.
- D. The color of sealants shall be as selected by Architect or as called for on drawings.
- E. Bond-breakers where required shall be as recommended by the sealant manufacturer.

2.02 FILLER MATERIAL FOR VERTICAL JOINTS:

- A. Filler material shall be a non-impregnated closed-cell, supporting type, compressible resilient, free from tar, asphalt, oil and other foreign substances. Filler shall be a closed-cell polyethylene foam, or isomeric polymer foam, (polystyrene will not be allowed). Filler shape shall be such that sealant in joint is fully supported against puncture or pressure, but of design to prevent sealant from being forced out of joint by contraction. Filler shall have characteristics of not bonding with sealant, surface of filler. Filler shall be at least 25% wider than width of joint measured in field to which it is applied. Compression on such installed filler shall be sufficient so as to allow no displacement.
 1. Closed-cell polyethylene joint filler foam backer rod material shall comply with ASTM D 1622.
 2. Where joint design, or depth of joint will not permit the use of joint backing, a bondbreaker tape must be installed to prevent three-sided adhesion. An adhesive backed polyethylene tape should be used.

PART 3 - EXECUTION

3.01 JOINT DIMENSIONS:

- A. The depth of a joint is defined as the distance from the outside face of the joint to closest point of joint filler, whether joint is rod shaped.

- B. Minimum size of joint should be four times the anticipated movement. Minimum joint dimension is 3/8" (9.5mm) x 3/8" (9.5mm), to allow for adequate cleaning and priming.
- C. For joints 1/2" (13mm) and wider, the depth of the sealant should be no more than 1/2" (13mm) deep.
- D. Joints to receive sealants shall be never less than 1/4" depth by 1/4" width.
- E. Joints larger than the above stated minimum dimensions, shall be provided in accordance with manufacturer's standard printed specifications and recommendations.
- F. The General Contractor shall determine and provide joints of dimensions as specified herein before.

3.02 JOINT INSPECTION:

- A. Inspect all joints which are to receive work of this section and notify Architect or dimensions and/or any existing conditions which will prevent satisfactory installation and performance of the sealants.
- B. Commencement of work on any joint shall be considered full acceptance of dimensions and condition of said joint.
- C. Joints to be sealed shall be thoroughly cleaned of mortar or any other foreign material in an approved manner before any sealant materials are applied. Any coating from metal surfaces shall be removed by use of solvent recommended by manufacturer of metal. Solvent shall not be allowed to air dry without wiping.
- D. Concrete and masonry surfaces shall be fully cured, free of release agents, curing compounds, loose aggregate and other surface treatments. Treated surfaces shall be tested for adhesion before proceeding with sealant work.
- E. Joint spaces and surfaces shall be thoroughly dry before installation of sealant materials. Unless approved means of drying joint is employed, do not install sealant material when temperature is below 40 degrees F or during and after rain and fog. To test for free moisture, run paper towel or paper napkin through joint. Paper shall be completely dry. Any alkaline seepage from fresh concrete shall be washed away, surface dried.

3.03 GENERAL WORKMANSHIP AND APPLICATION:

- A. Use thoroughly experienced workmen in the application and as per manufacturer's recommendations.
- B. Primer shall be used as it comes from can, unadulterated. Apply as per manufacturer's printed directions and/or recommendations. Prime joints before insertion of joint filler material.
- C. Fill joint with filler material so that depth and width of joint have relationships as noted hereinafter under "Joint Dimensions".
- D. When installing rod stock filler, roll filler into joint. Rod filler in final position shall not be twisted.
- E. Bond-breaker strip shall be used in joints where sufficient room for back-up does not exist.
- F. In mixing sealant compound components, do not whip excessive air into said materials. Mix strictly as recommended by manufacturer.

- G. Sealant materials shall be applied within "application life" recommended by manufacturer for prevailing temperature and humidity conditions. Do not retemper.
- H. Protect exposed surfaces adjacent to joints to prevent permanent staining or other damage to adjacent work. Be fully responsible for any staining and/or other damage caused under work of this section to any adjacent work.
- I. If manufacturer indicates there is any possibility of color of sealant material being changed by use of wetting agents while tooling, Contractor shall dry tool.
- J. Joints shall be lightly tooled into place immediately after application, when necessary to give concave shaped surface.
- K. Immediately after application of sealants, thoroughly clean adjacent surfaces which may have been soiled, as per sealant manufacturer recommendations. Leave work in neat and clean conditions to full satisfaction of Architect.

3.04 GENERAL PERFORMANCE:

- A. Sealants: Except as otherwise indicated, joints are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealants to comply with this requirements will be recognized as failures of materials and workmanship.

END OF SECTION 07 9200

SECTION 31 2200 - GRADING

PART 1– GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, General and Supplementary Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK

- A. Provide all materials, labor, equipment, and services necessary to complete all site grading as indicated in this Construction Documents. The work consists of, but is not limited to:
 - 1. Stripping, stockpiling, and removal of Topsoil.
 - 2. Earth moving and land balance required to meet proposed subgrades.
 - 3. Subgrade preparation of building slabs, walks, and pavements.
 - 4. Compaction of all areas in native soil, cut or fill.
 - 5. Stockpiling and removal of suitable and unsuitable material other than Topsoil.
- B. Related work specified elsewhere:
 - 1. Section 03 3300: Cast-in-Place Concrete
 - 2. Section 32 0515: Soils for Exterior Improvements
 - 3. Section 32 1216: Asphalt Paving

1.03 QUALITY ASSURANCE

- A. If required, the services of a Soils Engineer and Soils Laboratory will be retained by the Owner, to observe earthwork operations, analyze soil materials and perform applicable laboratory and field tests.
- B. The Contractor shall arrange and pay for any other test or required inspections needed to meet the requirements set forth in these Construction Documents.
- C. As a minimum the Soils Engineer shall perform the following tests:
 - 1. The soils laboratory shall analyze all native or imported fill and backfill material and topsoil proposed for use to determine the suitability for use and compliance with the Contract Documents.
 - a. Fill and backfill material shall be examined as to soil classification and tested to determine the plasticity index, optimum moisture content and dry density.
 - b. After rough grading and prior to spreading of topsoil, the topsoil in lawn areas and the topsoil to be placed in and subgrade in planting beds shall be examined for organic content, acidity, and soil composition.

2. All natural grades to be retained, all areas of cut, and all areas of controlled fill shall be field tested by the Soils Engineer for moisture content and percent of compaction for compliance with specified values.
3. The number of tests performed shall be at the discretion of the Soils Engineer. Except that the number of field tests performed shall not be less than the minimum described below.
 - a. Within the paved areas of the site, except trench excavations perform one (1) test for every 2000 cubic yards of fill or in areas of natural grade or cut one (1) test for every 40,000 square feet.

Emphasis should be given to the aesthetic appearance and functioning of berming and swales, as directed by the Landscape Architect or Owner's Representative. The Contractor shall employ skilled personnel and any necessary equipment to ensure that finish grading is smooth, aesthetically pleasing, drains well and is ideal for receiving sod and plant materials.

1.04 SUBMITTALS

- A. The Soils Engineer shall submit the following reports directly to the Owner or Owner's Representative, with a copy to Contractor:
 - B. Classification and suitability of borrow material.
 - C. Field reports; in-place soil density tests.
 - D. Compaction Results
 1. The Soils Engineer shall advise the Contractor and Owner or Owner's Representative immediately of any compaction tests failing to meet specified minimum requirements. The contractor shall take appropriate steps to meet the compaction requirements. No additional lift is to be placed onto a soil with any portion failing to meet compaction requirements.

1.05 DEFINITIONS

- A. **EXCAVATION:** Consists of removal of material encountered to subgrade elevations indicated on the Plans, Specifications, Addenda, Change Orders or other written direction by the Owner.
- B. **UNAUTHORIZED EXCAVATION:** Consists of removal of materials beyond indicated elevations or dimensions. Unauthorized excavation will be restored as indicated below at no expense to the Owner.
 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when approved by Soils Engineer.

2. In locations other than those above, backfill and compact unauthorized excavations with material approved by the Soils Engineer.

1.06 JOB CONDITIONS

- A. The Contractor shall visit the site and acquaint himself with all existing conditions. The Contractor shall be responsible for his own subsurface investigations, as necessary, to satisfy requirements of this Section. All subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Owner's Representative.
- B. SITE INFORMATION: The data provided regarding subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that the Owner will not be responsible for interpretations or conclusions made by the Contractor.
- C. It will be the responsibility of the Contractor to coordinate and schedule the grading operations with the excavation and Site Utility Contractors so as to provide for a smooth and orderly progression of the Work.
- D. The Contractor shall provide the services of a Registered Land Surveyor to establish all lines, levels, grades, benchmarks and measurements required to lay out the Work.
- E. Construction stakes becoming misaligned are to be checked before proceeding with the Work. Any re-staking required will be paid for by the contractor.
- F. EXISTING UTILITIES: Locate existing underground utilities in areas of Work. If utilities are to remain in place, provide means of support and protection during earthwork operations.
 1. Before starting site operations verify that the earlier Contractors have disconnected all temporary utilities which might interfere with the fine grading work.
 2. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from damage, remove or relocate as indicated, specified, or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of active utilities.
 3. Should pipes, conduit, or other utilities be encountered during excavation, consult Utility Owner immediately for directions. Cooperation with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of Utility Owner.
 4. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by the Owner and then only after acceptable temporary utility services have been provided.
 - a. Provide minimum of 48-hours' notice to the Owner and receive written notice to proceed before interrupting any utility.

- G. Demolish and completely remove from Site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.
- H. Protect benchmarks, utilities, structures, fences, sidewalks, paving, and other facilities from earthwork equipment. In the event of damage, immediately make all repairs, replacements and dressings to damaged plants necessary. Contractor shall incur all cost for the replacement of damaged objects and vegetation.
- I. Natural features which are not subject to changes by reason of the Drawings and Specifications shall not be defaced or injured in any manner.
- J. The Contractor shall guard against movement or settlement of adjacent buildings or structures, and provide bracing, as necessary. He shall be responsible for safety and support of such buildings or structures and be liable for any movement or settlement. If at any time any adjacent buildings or structures appear to be endangered or unsafe, he should cease operations, and take precautions to support such buildings or structures. Once building or structures have been stabilized, the Contractor should notify the local Building Inspector and the Engineer. Operations shall be resumed only after permission has been granted. If the Engineer or Building Inspector considers additional bracing or shoring necessary to safeguard, or prevent movement or settlement, such bracing or shoring should be installed. If the Contractor fails to comply promptly with such order, such bracing and shoring may be placed by the Owner, at no expense to the Owner.
- K. Dust control: Use all means necessary to prevent dust from construction operations from being a nuisance to adjacent property owners and from damaging finish surfaces on adjacent building, paving, etc. Methods used for dust control are subject to approval by the Landscape Architect of Owner's Representative.

PART 2- PRODUCTS

2.01 FILL MATERIAL

- A. Materials for fill required to achieve design grades shall be either on- or offsite soils which are free of organic matter and debris. Refer to plan details for appropriate fill materials.

PART 3- EXECUTION

3.01 TOPSOIL STRIPPING / REMOVAL

- A. Strip topsoil in all cut-and-fill areas and remove from site.
- B. It shall be the responsibility of the contractor to dispose of any unused topsoil offsite in a legal manner.

3.02 PROOF ROLLING

- A. Do all cutting, or site grading work required to meet indicated subgrades. After completion of the earthwork operation, the subgrade area not receiving fill material shall be proof rolled in place and then compacted as specified under "Compaction Density" for a particular area classification. The subgrade area receiving fill material shall be proof rolled prior to placement of fill.
 - 1. During the performance of site grading operations, the subgrade shall be examined critically; and any areas discovered which, in the opinion of the Owner's Representative or Soils Engineer, are soft and unstable, shall be excavated to such depths as may be necessary to insure satisfactory supporting properties. These areas of excavation shall be backfilled immediately and shall be brought back to the elevation of the surrounding areas with approved fill material and in accordance with the earth fill construction procedure.
 - 2. If pockets of unstable ground are encountered, notify the Owner's Representative or Soils Engineer to determine course of action. Do not proceed in area until authorization is granted.

3.03 PLACEMENT

- A. Prior to grading operations, remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.
- B. Fill all areas as required to meet indicated subgrades. Fill material shall conform to the requirements of these Specifications and shall be approved by the Soils Engineer prior to placement.
 - 1. The surface of all areas shall be scarified by means of a disc or harrow to a minimum depth of 4-6 inches. An initial three-inch (3") layer of fill material shall then be spread over the scarified surface and the entire area compacted per the "Compaction Density" requirements.
- C. Fill shall be deposited in 8-in. loose layers for material compacted by heavy compaction equipment, and not more than 4" layer when compacted by hand-operated tampers.
 - 1. No frozen material should be used as fill nor shall any fill be placed on surfaces that are frozen or contain frost or ice.
 - 2. When the fill meets the natural grade of a slope, a bench shall be cut in the existing slope. These cuts are to serve as keys to connect the existing grades with a newly-placed fill.
- D. The moisture content of fill material shall not deviate from the optimum by more than 2 percent. Moisture content shall not exceed the optimum of any material which displays pronounced deformation under construction equipment. Drying of wet soil shall be expedited using plows, discs, harrows, or other approved methods. If additional water is required, it should be uniformly distributed and shall be thoroughly incorporated into the material by means of discs or other suitable mixing equipment. Care shall be taken to avoid trapping water within the fill.

1. If soft, yielding material is encountered in cuts or in fills as a result of trapping water, and cannot be satisfactorily stabilized by moisture control and compaction, the unstable material shall be excavated to the depth required by the Soils Engineer. The excavation shall then be filled with suitable material and compacted.
- E. If sufficient approved native fill material is not available to achieve indicated subgrade elevations, the Contractor shall obtain additional material from off-site borrow pits.
- F. Perform topsoil installation within contract limits, including adjacent transition areas, to new elevations, levels, profiles, and contours indicated. Provide uniform levels and slopes between new elevations and existing grades.
- G. Regardless of finish grading elevations indicated, it is intended that grading be such that proper drainage of surface water will be directed away from buildings and that no low areas are created to allow ponding. Contractor to consult with Owner or Landscape Architect regarding minor variations in grade elevations before rough grading is completed.
- H. Supply and spread topsoil to a uniform depth as noted on the plans or indicated in the landscape restoration section of the contract documents.
- J. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture ready to accept seed or sod.
- K. Provide earth crowning where indicated on drawings.
- L. Crowning/mounding to be free flowing in shape and design, as indicated, and to blend into existing grades gradually so that toe of slope is not readily visible. Engineer to verify final contouring before planting.
- M. The surface will be graded smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of +1/10 of a foot when tested with a 10' straightedge.

3.05 LAND BALANCE

- A. A balanced grading plan is **NOT** provided for this project. All removal of material from the site or fill material necessary to bring the site to the indicated elevations shall be the Contractor's responsibility as part of the base bid. The Contractor is responsible to make his own determination of the quality of required fill or surplus material.

3.06 UNNECESSARY GRADING

- A. Unnecessary Grading: The expense of grading of materials outside of limits indicated or ordered in writing by the Engineer and the correction thereof to the satisfaction of the Engineer shall be borne by the Contractor.

- B. Unnecessary grading under footings: Either deepen footings to bear on actual subgrade elevation without changing top elevations or place concrete fill up to required elevation, as required by the Engineer.
- C. Unnecessary grading other than under footings: Either place compacted fill or otherwise correct conditions, as required by the Engineer.
- D. When required by the architect due to the unforeseen presence of unsatisfactory materials or other factors, perform additional grading and replace with approved compacted fill material in accordance with the Owner’s instructions.
- E. Payment for unforeseen additional work will be made in accordance with established unit prices or, if none, in accordance with provisions for changes in the work. No payment will be made for correction of subgrades improperly protected against damage from freeze-thaw or accumulation of water, or for correction of otherwise defective subgrades.

3.07 COMPACTION / DENSITY

- A. Compact to at least the following percentage of maximum density, as determined by ASTM D-1557 (Modified Proctor). No deviation from these compaction densities will be allowed unless specifically approved by the Soils Engineer:

<u>Material</u>	<u>%</u>	<u>of</u>	<u>Maximum</u>
<u>Density</u>			
Fill under pavement or sidewalks, and within a 1:1 slope	95%		
Fill in Landscape areas	85%		

- B. No backfill shall be placed against any masonry or other exposed building surface until permission has been given by the Owner's Representative, and in no case until the masonry has been in place seven days.
- C. Compaction in limited areas shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than four inches thick. The hand tampers used shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent any wedging action against masonry or other exposed building surfaces.
- D. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

3.08 MAINTENANCE

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

- D. Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent Work and eliminate evidence of restoration to greatest extent possible. No additional payment will be made.

3.09 FIELD QUALITY CONTROL

- A. Compaction testing will be performed in accordance with ASTM D1557.
- B. If tests show Work does not meet specified requirements, remove Work, replace and retest.
- C. Frequency of Tests: Every 50 feet apart or as specified by the Engineer.
- D. Bring to required grade, areas where settlement, erosion, or other grade changes occur. Adjust grades as required to carry drainage away from buildings and to prevent ponding around the buildings and on pavements.
- E. Remove all rock or objectionable material larger than 1 inch prior to commencing landscaping.
- F. Contractor shall be responsible for stabilizing grades by approved methods prior to landscaping and shall be responsible for correction of grades as mentioned above, and cleanup of any wash outs or erosion.

3.011 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Contractor is to completely remove from site all waste material, including unacceptable excavated material, trash, and debris, in a legally established method.

END SECTION 31 2200

SECTION 31 2216 - FINE GRADING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and General and Supplemental Requirements. Which are hereby made a part of this section.

1.02 WORK INCLUDED:

- A. Provide all labor, materials, necessary equipment, and services to complete the Fine Grading work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".
- B. Related work specified elsewhere:
 - 1. Section 31 2200: Grading
 - 2. Section 32 0515: Soils for Exterior Improvements
 - 3. Section 32 8423: Underground Sprinklers
 - 4. Section 32 9219: Seeding (Alternate 1)
 - 5. Section 32 9223: Sodding (Base Bid)
 - 6. Section 32 9300: Plants, Preparation and Accessories

1.03 SITE INSPECTION:

- A. The Contractor shall visit the site and acquaint himself with all existing conditions. The Contractor shall be responsible for his own subsurface investigations, as necessary, to satisfy requirements of this Section. All subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Landscape Architect or Owner's Representative.

1.04 EXISTING CONDITIONS:

- A. Obtain drawings showing proposed final grading from Civil Engineer, as indicated on drawings.
- B. Major demolition, site preparation and general site earthwork will be accomplished under another, earlier contract. Verify that contours and grades established under that Contract are within one tenth (.1) of a foot of proposed grades shown on grading plans. Make whatever corrections and/or repairs necessary to make finish grades consistent with the requirements of the grading drawings and specifications.

1.05 UTILITIES:

- A. Before starting site operations, verify that the earlier Contractors have disconnected all temporary utilities that might interfere with the fine grading work.
- B. Locate all existing, active utility lines traversing the site and determine the requirements for their protection. Preserve in operating condition all active utilities adjacent to or transversing the site that are designated to remain.

- C. Observe rules and regulations governing respective utilities in working under requirements of this section. Adequately protect utilities from damage, remove or relocate as indicated, specified, or required. Remove, plug or cap inactive or abandoned utilities encountered in excavation. Record location of active utilities.

1.06 QUALITY ASSURANCE:

- A. Requirements of all applicable building codes and other public agencies having jurisdiction upon the work.
- B. Primary emphasis should be given to the aesthetic appearance and functioning of berming and swales, as directed by the Landscape Architect or Owner's Representative. The Contractor shall employ skilled personnel and any necessary equipment to ensure that finish grading is smooth, aesthetically pleasing, drains well and is ideal for receiving sod and plant materials.

PART 2 - MATERIALS

2.01 EXISTING SOIL:

- A. Use on-site material, unless otherwise directed by Owner's Representative, free from debris, sod, biodegradable materials and other deleterious materials. The Contractor shall insure that all existing soil has sufficient percolation and surface drainage to support grasses and plant material and that extreme compaction occurs only in areas to receive paving.
- B. In areas to receive seeding, verify that soil is scarified to depth of 4" and that soil contains enough organic matter to support and encourage rooting.

PART 3 - EXECUTION

3.01 JOB CONDITIONS:

- A. Dust control: Use all means necessary to prevent dust from construction operations from being a nuisance to adjacent property owners and from damaging finish surfaces on adjacent building, paving, etc. Methods used for dust control are subject to approval by the Landscape Architect of Owner's Representative.
- B. Burning: On-site burning will not be permitted.
- C. Protection: Use all means necessary to protect curbs, gutters, sprinklers, utilities and vegetation designated to remain, and, in the event of damage, immediately make all repairs, replacements and dressings to damaged plants necessary to the approval of the Landscape Architect. Contractor shall incur all cost for the replacement of damaged objects and vegetation.

3.02 SCHEDULING:

- A. Schedule all work in a careful manner with all necessary consideration for adjoining property owners and the public.
- B. Coordinate schedule with other Contractors to avoid conflicts with their work.

3.03 EXCAVATION:

- A. Excavate where necessary to obtain subgrades, percolation and surface drainage as required.
- B. Materials to be excavated are unclassified.
- C. Remove entirely any existing obstructions after approval by the Landscape Architect's or Owner's Representative.
- D. Remove from site and dispose of debris and excavated material not required.

3.04 GRADING:

- A. The Contractor shall establish finished grades as shown on the grading plan and as directed by the Architect, including areas where the existing grade has been disturbed by other work.
- B. Finished grading shall be smooth, aesthetically pleasing, drain well and ready to receive sod and other plant material to full satisfaction of the Owner's Representative, Architect and Construction Manager.

3.05 COMPACTION:

- A. Compact each layer of fill in designated areas with approved equipment to achieve a maximum density at optimum moisture, AASHTO T 180 - latest edition.
 - 1. Under urbs, walks and other paved areas: compaction shall be to 95% of maximum density.
 - 2. Under landscaped area, compaction shall not exceed 85% of maximum density.
- B. No backfill shall be placed against any masonry or other exposed building surface until permission has been given by the Owner's Representative, and in no case until the masonry has been in place seven days.
- C. Compaction in limited areas shall be obtained by the use of mechanical tampers or approved hand tampers. When hand tampers are used, the materials shall be deposited in layers not more than four inches thick. The hand tampers used shall be suitable for this purpose and shall have a face area of not more than 100 square inches. Special precautions shall be taken to prevent any wedging action against masonry or other exposed building surfaces.

3.06 CORRECTION OF GRADE:

- A. Bring to required grade levels areas where settlement, erosion or other grade changes occur. Adjust grades as required to carry drainage away from buildings and to prevent ponding around the buildings and on pavements.
- B. Remove all rock or objectionable material larger than 1" any direction prior to commencing landscaping.
- C. Contractor shall be responsible for stabilizing grades by approved methods prior to landscaping and shall be responsible for correction of grades as mentioned above and cleanup of any wash outs or erosion.

END OF SECTION 31 2216

31 2500 – EROSION AND SEDIMENTATION CONTROL

PART 1- GENERAL

1.01 REGULATORY REQUIREMENTS

- A. The general conditions and supplemental conditions are made a part of this Section. Work under this Section includes all work necessary for effective soil erosion and sedimentation control in conformance with Part 91, Act 451, PA 1994, the Soil Erosion and Sedimentation Control Act.
- B. Rules, regulations or laws of any controlling governmental agency shall govern, when they are more stringent than the requirements of this Section.
- C. All earth changes shall be made in such a manner as to minimize the area of disturbed land exposed and unprotected against erosion and the duration of such exposure.
- D. Sediment caused by accelerated soil erosion shall be restricted to a non-polluting minimum (as determined by the agency designated in accordance with and having jurisdiction and responsibility for the enforcement of sedimentation control).
- E. All sedimentation control measures shall be maintained in an operating condition satisfactory to the designated agency, for the period of time which that agency deems necessary. This provision applies to all facilities that directly receive waters from the earth-change area, whether such facilities are a part of the proposed construction or existed prior to proposed construction.
- F. Temporary stabilization measures shall be repeated when, and as often as, required by the governing agency.
- G. Any facility constructed for the conveyance of water around, through or from the earth-change area shall limit the water flow to a non-erosive velocity.
- H. Temporary sedimentation control devices and facilities shall be removed upon completion of the primary construction. The land surface area formerly occupied by such facilities shall then be graded and restored in accordance with the Plans and Specifications.
- I. Obtain all pertinent permits including a Soil Erosion Control Permit from the county or local enforcing agency. Submit an NPDES Notice of Coverage, if required, when the soil erosion permit is received.

PART 2- PRODUCTS

2.01 MATERIALS

- A. Straw bales and mulch shall be clean wheat straw or marsh hay. Straw shall be clean and free of weeds and weed seed. Hay will be allowed only when straw is not available. Bales are to be standard rectangular shape held together with 2 strands of hemp rope.

- B. Sediment control / silt fence shall be a geotextile filter fabric capable of containing sediment, attached to wooden stakes capable of supporting the geotextile fabric.
- C. Acceptable geotextile catch basin filter bag.

PART 3-EXECUTION

3.01 CONSTRUCTION SEQUENCE

- A. To minimize the area of unstabilized land surface over which storm waters must flow, construction shall proceed from lower ground toward higher ground whenever possible.

3.02 TEMPORARY STOCKPILES

- A. The Contractor shall take steps to prevent, or contain on-site, erosion from material stockpiles.

3.03 SEDIMENTATION CONTROL

- A. The Contractor shall provide a suitable temporary sedimentation control facility at any connection to an existing enclosed storm drain, to minimize deposition of sediment in the existing storm drain during construction.
- B. To prevent sediment from entering existing storm drains during the construction period, the Contractor shall provide suitable control facilities around storm water inlet facilities.
- C. All open ditches and natural watercourses intercepted by the proposed construction shall be temporarily re-routed, provided with temporary sedimentation control facilities within their cross-section, and/or diverted into a newly-established drain via non-erosive channels.
- D. Temporary sedimentation control devices and/or facilities shall be as designated on the Plans. Modifications to the Plan requires prior approval of the Engineer and local permitting agency.
- E. In all cases, such facilities, whether permanent or temporary, shall be provided prior to any significant clearing, grading or surface disruption of the tributary area.

3.04 DE-WATERING

- A. Pumped water from well points or de-watering wells installed to lower the water table to facilitate the proposed construction shall not discharge onto unstabilized areas. Such discharge shall be conveyed by pipe, hose or stabilized channel to a settling basin or other suitable sedimentation control facility.

3.05 VEHICULAR CONTROLS

- A. Employ suitable cleaning methods to minimize the transfer of sediment-producing materials from the wheels of the vehicles onto adjacent improved surfaces. Contractor shall keep adjacent roads free of debris.

3.06 RESTABILIZATION OF TERRAIN

- A. Final cleanup shall leave the property in as good or better condition than it was at the beginning of construction. Cleanup operations including at least rough grading and temporary stabilization shall be started as soon as feasibly possible where:
 - 1. Pipe is laid in any location.
 - 2. One acre or more of the ground surface is brought to its approximate proposed elevation, in an earth excavation, mining, landfilling, mass grading, or land balancing project; or of substantial completion of the base for the sidewalk construction and shall be completed within the next fifteen (15) days.
- B. Temporary stabilization applied during freezing weather shall consist of hay or straw mulch applied at the rate of 2 tons per acre, "tacked" in place by locally approved methods. Temporary stabilization applied during other than freezing weather shall consist of perennial rye grass applied at the rate of 25 pounds per acre with hay or straw mulch applied at the rate of 2 tons per acre, "tacked" in place with locally approved methods.
- C. Temporary stabilization shall be provided during the non-growing season for all areas to be seeded / sodded. This time period is generally from October 15 through April 15, both inclusive.
- D. Temporary stabilization shall be provided for all uncompleted areas where significant earth disruption ceases for more than 30 days.
- E. All areas which have been temporarily stabilized shall be permanently stabilized no later than 30 days following commencement of the planting season immediately following substantial completion of construction.
- F. All mulch used for temporary stabilization shall be removed prior to permanent stabilization.
- G. Permanent Stabilization is hereby defined as the Work described elsewhere in the Specifications.

3.07 CONTRACTOR'S GENERAL RESPONSIBILITY

- A. The Contractor shall be responsible for the proper implementation of the "Soil Erosion and Sedimentation Control Plan" as a part of this Contract. If a Soil Erosion and Sedimentation Control plan is supplied in the project drawings, the contractor shall install the proposed Soil Erosion and Sedimentation Control measures per the plan, or as dictated by the governing agency. If a plan is not supplied, it is the responsibility of the contractor to meet all local and state ordinances. A regular inspection program and a thorough maintenance program shall be developed and implemented by the Contractor to insure the effectiveness of the erosion and sedimentation control practices.

END SECTION 31 2500

SECTION 32 0190 - OPERATION & MAINTENANCE OF PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. The requirements of this section include a one year warranty period from date of acceptance of installation.
- B. Related Work Specified Elsewhere:
 - 1. Section 32 8423: Underground Sprinklers
 - 2. Section 32 9219: Seeding (Alternate 1)
 - 3. Section 32 9223: Sodding (Base Bid)
 - 4. Section 32 9300: Plants, Preparation & Accessories

1.03 ACCEPTANCE OF INSTALLATION:

- A. At the completion of all landscape installation, or pre-approved portions thereof, the Landscape Contractor shall request in writing an inspection for acceptance of installation in which the Landscape Contractor, Landscape Architect and Owner's Representative shall be present. After this inspection a "Punch List" will be issued by the Landscape Architect and/or Owner's Representative. After completion of punch list items, the Landscape Architect, Contractor and Owner's Representative shall re-inspect the project and upon satisfactory completion of punch list items, issue a written statement of acceptance of installation and establish the beginning of the project warranty period.
- B. It is the responsibility of the Landscape Contractor to make the above written request for inspection of installation in a timely fashion. If there is plant material loss prior to the Landscape Contractor's written request for inspection of installation, the Landscape Contractor shall make all replacements of this dead material at no additional cost. These replacements are not considered to be the required one (1) replacement of dead plant material by the Landscape Contractor during the one (1) year project warranty period, as outlined below.
- C. Landscape work may be inspected for acceptance in parts agreeable to Owner's Representative and Landscape Architect provided work offered for inspection is complete, including maintenance as required.
- D. For work to be inspected for partial acceptance, supply a written statement requesting acceptance of this work completed to date.

1.04 PROJECT WARRANTY:

- A. The project warranty period begins upon written acceptance of the project installation by Landscape Architect and Owner's Representative.

- B. The landscape contractor accepts responsibility for the irrigation system operation, watering schedule, watering amounts and monitoring system for duration of maintenance and warranty period.
- C. The Landscape Contractor shall guarantee trees, shrubs, ground cover bed and seeded areas through construction and for a period of one year after date of acceptance of installation against defects including death and unsatisfactory growth, except for defects resulting from neglect by owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Landscape Contractor's control.
- D. The Landscape Contractor shall warranty plants due to overwatering or under watering by automatic irrigation system during maintenance and warranty period.

1.05 MAINTENANCE

- A. To insure guarantee standards, the following maintenance procedures shall be executed during construction and for the full project warranty period.
- B. Maintenance of Trees:
 - 1. Landscape Contractor shall be responsible for only one (1) replacement of any plant materials after project acceptance date, see Section 1.03, that are dead or in the opinion of the Landscape Architect are in an unhealthy or unsightly condition, or having lost natural shape, resulting from die back, excessive pruning, excessive or deficient watering practices, or inadequate or improper maintenance as part of the guarantee. Prior to any replacements Landscape Contractor shall review individual plants in question with Landscape Architect and determine the reason for plant demise.
 - 2. Replacements must meet specifications i.e. quality, species of plant material and planting procedures to receive approval of replacement materials by Landscape Architect.
 - 3. Costs for replacements are assumed part of bid quotations and therefore will not result in an additional cost to Owner or Landscape Architect.
 - 4. Areas damaged as result of replacement operations are to be restored by Contractor at no cost to the Owner or Landscape Architect.
 - 5. The contractor shall be responsible for keeping guy wires taut, raise tree balls which settle, furnish and apply sprays as necessary to keep the plantings free of disease and insects until the end of the warranty period. All evergreens shall be watered thoroughly and wilt proofed in the fall to insure they do not go into the winter dry.
 - 6. Winter Evergreen Protection (Trees and Shrubs): Treated burlap (green) and 2' x 2' x 8' hardwood stakes @ 4'-0" O.C. Attach burlap to wood lath with roofing nails. Contractor shall erect, remove and deliver to owner. Contractor shall install winter protection the first winter, install December 1 and remove April 15. Install screen height as required. Spray evergreens with wiltproof prior to December and again in February, two coatings are required; apply per manufacturer's recommendations.
 - 7. The contractor shall be responsible for watering of all plantings throughout construction, maintenance and warranty periods.
 - 8. The contractor will be responsible for irrigation system operation, watering schedules, watering amounts and general monitoring of irrigation system throughout construction,

maintenance and warranty period. Overwatering or lack of from irrigation system source is the responsibility of the landscape contractor.

9. Remove and replace trees, shrubs, or other plants found to be dead or in unhealthy condition. Remove rejected plants and materials promptly. Make replacements during normal planting season and schedule. Replace trees and shrubs which are in doubt, unless, in opinion of Owner's Representative and Landscape Architect it is advisable to extend warranty period for a full-growing season. Remove all stakes, guy wires, tree wrap paper, dead twigs and branches from tree and plant materials at the end of this warranty period. Keep planting beds free of weeds during guarantee period. See Trees, Plants and Ground Covers Section for suggested herbicides.

C. Maintenance of Seeded Lawn Areas (Alternate 1)

1. The Contractor shall establish a dense lawn of permanent grasses, free from lumps and depressions or any bare spots, none of which is larger than one foot of area up to a maximum of 3% of the total seeded lawn area. Any part of the seeded lawn that fails to show a uniform growth and/or germination shall be reseeded until a dense cover is established.
2. If seeded in fall or if not considered acceptable at that time, continue maintenance the following spring until acceptable lawn is established.
3. The Contractor shall provide a minimum of two cuttings of the lawn or more as necessary until the inspection and acceptance of installation by the Owner's Representative and Landscape Architect. When the lawn reaches 3 inches in height it shall be cut to 2 inches in height. When meadow lawn reaches 6" in height it shall be cut to 4" in height.
4. The Owner assumes cutting responsibilities following the acceptance of installation by the Owner's Representative and the Landscape Architect.
5. After acceptance of installation, and for the duration of the project warranty period the Landscape Contractor shall continue all other maintenance procedures including fertilizing and weeding, and other operations such as rolling, regrading, replanting, and applying herbicides, fungicides, insecticides as required to establish a smooth, acceptable lawn free of eroded or bare areas.
6. Repair, rework, and re-seed all areas that have washed out, and eroded, or do not substantially germinate.
7. See Section 1.05,B: Items 6 and 7.
8. At conclusion of project warranty period and after receiving written final acceptance by Owner's Representative and Landscape Architect, the Owner shall assume all seeded lawn maintenance responsibilities.

D. Maintenance of Sodded Lawn Area (Base Bid)

1. Maintain sodded lawn areas, including watering, fertilizing, spot weeding, mowing, application of herbicides, fungicides, insecticides, and resodding until a full, uniform stand of sod is knitted to topsoil.
2. Water sod thoroughly, as required to establish proper rooting.

3. Repair, rework and resod all areas that have washed out or are eroded. Replace undesirable or dead areas with new sod.
4. Provide a uniform stand of grass by watering, mowing, and maintaining lawn areas until acceptance of installation. Resod areas, with specified materials, which fail to provide a uniform stand of grass until all affected areas are accepted by Landscape Architect.
5. Mow lawn areas as soon as lawn top growth reaches a 3" height. Cut back to 2" height. Repeat mowing as required to maintain specified height. Not more than 40% of grass leaf shall be removed at any single mowing. Minimum of two cuttings.
6. Sodded areas will be acceptable provided all requirements, including maintenance, have been complied with, and a healthy, even colored viable lawn is established, free of weed, undesirable grass species, disease, and insects.
7. After acceptance of installation, and for the duration of the project warranty period the Landscape Contractor shall continue all maintenance procedures including fertilizing, weeding, rolling, regrading, resodding and applying herbicides, fungicides, insecticides as required to establish a smooth acceptable lawn, free of eroded or bare areas. The landscape contractor is not responsible for mowing after acceptance of installation and required cuttings.
8. See Section 1.05,B: Items 6 and 7.
9. At Conclusion of project warranty period and after receiving written final acceptance by Owner's Representative and Landscape Architect, the Owner shall assume all sodded lawn maintenance responsibilities.

1.06 FINAL ACCEPTANCE:

- A. At the conclusion of the project warranty period the Landscape Contractor shall request a project inspection for final acceptance in which the Landscape Contractor, Landscape Architect and Owner's Representative shall be present. After this inspection a "Punch List" will be issued by the Landscape Architect. Upon completion of all punch list items, the Landscape Architect and Owner's Representative shall reinspect the project and issue a written statement of final acceptance. Upon final acceptance the Owner assumes all maintenance responsibilities for the landscape of the project.

PART 2 AND 3 - PRODUCTS AND EXECUTION

Not Applicable.

END OF SECTION 32 0190

SECTION 32 1090.33 - TREE AND SHRUB PRESERVATION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of tree and plant protection is shown on drawings and by provisions of this Section.
- B. Related Work Specified Elsewhere:
 - 1. Section 02 4113: Selective Site Demolition
 - 2. Section 31 2200: Grading
 - 3. Section 32 2500: Soil Erosion and Sedimentation Control
 - 4. Section 32 0515: Solis for Exterior Improvements

1.03 DEFINITIONS:

- A. Protective Barrier: A temporary device installed during the full period of construction to protect existing vegetation from damage or disturbance.
- B. Damage: Physical change to the site or its vegetation caused by equipment, materials, labor or grading operations which has occurred after on site work operations have commenced.
- C. Drip Line: The outer perimeter of the plant canopy projected on the ground plane.
- D. Existing Vegetation: Any existing tree, shrub or ground cover presently on site and which will remain.
- E. Protection: Means of protecting existing site vegetation from trespass, damage or disturbance by use of barriers or other means necessary to prevent trespass, damage or disturbance.

1.04 QUALITY ASSURANCE:

- A. Arborist Qualifications: Engage a qualified Arborist who has successfully completed tree protection and trimming to perform the following work:
 - 1. Remove branches from trees that are to remain if required.
 - 2. Recommend procedures to compensate for loss of roots and perform initial pruning of branches and stimulation of root growth where removed to accommodate new construction.
 - 3. Recommend procedures for excavation and grading work where adjacent to established plants.
 - 4. Perform tree repair work for damage incurred by new construction.

1.05 SUBMITTALS:

- A. Certification: Submit written certification by qualified Arborist that trees and plants indicated to remain have been protected during course of construction in accordance with recognized standards and that where damage did occur, trees and plants were promptly and properly treated. Indicate which damaged trees and plants (if any) are incapable of retaining full growth potential and are recommended to be replaced.

1.06 PROJECT CONDITIONS:

- A. Temporary Protection: Provide temporary fencing, barricades or other suitable guards located outside drip-line to protect trees and other plants that are to remain from damage.
- B. Root Systems: Do not store construction materials, debris, or excavated material within drip line of trees to remain. Do not permit vehicles within drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems within drip line.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Barriers: Wood and wire snow fence or plastic safety fence 4'-0" high.
 - 1. Support barriers with 6'-0" steel fence posts spaced not more than 8'-0" O.C.
- B. Tree Pruning Compound: Waterproof, antiseptic, elastic and free of kerosene, coal tar, creosote and other substances harmful to plants.
- C. Drainage Fill: Selected stone or gravel, graded to pass a 3 inch sieve and retained on a 1 inch sieve.
- D. Topsoil: See Section 32 0515.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION:

- A. Do not commence clearing operations prior to installing protective barriers.
- B. Protect tree root systems from damage due to noxious materials caused by run-off or spillage during mixing, placement or storage of construction materials, Protect root systems from flooding, eroding or excessive wetting resulting from watering operations.
- C. Do not allow fires under or adjacent to trees or other plants that are to remain.
- D. Remove branches from trees that are to remain if required to clear new construction.
 - 1. Where directed by Architect extend pruning operations to restore natural shape of entire trees.
 - 2. Cut branches and roots, if required, with sharp pruning instruments; do not break or chop.

3.02 EXCAVATION AROUND TREES:

- A. Excavate within proximity of trees only where indicated. Do not machine excavate within drip-line.
- B. Where excavating for new construction is required within drip line of trees, hand excavate to minimize damage to root systems. Provide sheeting at excavations if required. Use narrow-tine spading forks and comb soil to expose roots.
 - 1. Relocate roots in backfill areas wherever possible. If large, main lateral roots are encountered, expose beyond excavation limits as required to bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3 inches back from new construction.
- C. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth.
- D. Where trenching for utilities is required within drip line, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots; cut only small roots that interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.
- E. Prune branches to balance loss to root system caused by damage or cutting of root system.

3.03 GRADING AND FILLING AROUND TREES:

- A. Maintain existing grade within drip-line of trees unless otherwise indicated.
- B. Lowering Grades: Where existing grade is above new finish grade shown around trees, gradually slope grade away from trees as recommended by Arborist. Do not reduce grade within drip-line.
 - 1. Prune branches to stimulate root growth and to compensate for loss of roots. Provide subsequent maintenance during the contract period as recommended by Arborist. Provide owner with typed instructions as recommended by Arborist. Provide owner with typed instructions for recommended long-range maintenance procedures to be followed after completion of construction operations.
- C. Raising Grades:
 - 1. Minor Fills: Where existing grade is 6 inches or less below elevation of finish grade shown, use topsoil fill material specified. Place in single layer and do not compact; hand grade to required finish elevations.
 - 2. Moderate Fills: Where existing grade is more than 6 inches, but less than 12 inches below finish grade elevation, place a layer of drainage fill on existing grade before placing topsoil. Carefully place against trunk of tree approximately 2 inches above finish grade elevation and extend not less than 18 inches from tree trunk on all sides. For balance of area within drip line perimeter, place drainage fill to an elevation 6 inches below grade and completely fill with a layer of topsoil to finish grade elevation. Do not compact drainage fill or topsoil layers; hand grade to required elevations.

3.04 REPAIR AND REPLACEMENT OF TREES:

- A. Repair trees damaged by construction operations. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.
- B. Remove and replace dead and damaged trees that Arborist determines to be incapable of restoration to normal growth pattern.
 - 1. Provide new trees of same size and species as those being replaced. Plant and maintain as acceptable to Architect and provisions stated in Section 32 9300.
- C. Maintain trees including fertilizing and watering.

3.05 DISPOSAL:

- A. Burning removed trees and branches is not permitted on site.
- B. Remove excess excavation, displaced trees and trimmings and dispose of off Owner's property.

END OF SECTION 32 0190.33

SECTION 32 0515 – SOILS FOR EXTERIOR IMPROVEMENTS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of Topsoil Work is shown on drawings and by provisions of this section.
- B. Topsoil for lawn work shall be provided by contractor from off-site sources free of herbicides and conforming to the specifications herein.
- C. Related Work Specified Elsewhere:
 1. Section 31 2216: Fine Grading
 2. Section 32 9219: Seeding (Alternate 1)
 3. Section 32 9223: Sodding (Base Bid)
 3. Section 32 9300: Plants, Preparation & Accessories

1.03 QUALITY ASSURANCE:

- A. Testing of supplied and/or stockpiled topsoil shall be performed by a qualified independent testing laboratory normally engaged in agronomic soil testing. Each soil sample tested shall be a composite of five to seven subsamples taken the full depth of proposed source. Discard upper 6 inches of stockpiled topsoil before collecting samples. All costs for collecting and testing of topsoil shall be borne by the Contractor.

1. Recommended testing laboratory:

A & L Great Lakes Laboratories, Inc.
3505 Conestoga Drive
Fort Wayne, IN 46808
(219) 483-4759

- B. Required Topsoil Tests:

1. Chemical analysis indicating:

- a. fertility: pH, nitrate nitrogen, ammonia nitrogen, phosphate phosphorous, potassium, calcium, magnesium.
- b. suitability: total salinity, boron, sodium, potassium, calcium, magnesium, chloride, sulfate.

2. Physical properties including:

- a. organic content
- b. particle size distribution

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1.04 SUBMITTALS:

- A. Submit two certified copies of soil tests for approval prior to initiating work.

1.05 PROJECT CONDITIONS:

- A. Known underground and surface utility lines are indicated on the civil drawings.
- B. Protect existing trees, plants, lawns and other features designated to remain as part of the landscaping work.
- C. Promptly repair damage to adjacent facilities caused by topsoil operations. Cost of repair at Contractor's expense.
- D. Promptly notify the Landscape Architect of unexpected sub-surface conditions.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Provide topsoil as required to complete job. Topsoil must meet testing criteria results specified. All processing, cleaning and preparation of this topsoil to render it acceptable for use is the responsibility of this contractor.

Supplied topsoil, shall be fertile, friable sandy, sandy loam soil without admixture of subsoil and free of stones, stumps, root, trash, debris, and other materials deleterious to plant growth. Topsoil shall not be frozen or muddy. Ph of existing or supplied soil to range between 6.5 and not more than 7.5. Topsoil that does not meet this pH range shall be amended with approved pH adjusters. Topsoil shall contain not less than 3% and not greater than 10% organic matter determined by loss through ignition. Clay content as determined by Bouyoucos Hydrometer Test shall range from 5% - 10%. Silt content shall not exceed 15%.

- B. Gradation of Topsoil:

<u>Sieve Designation</u>	<u>Percent Passing</u>
1 inch screen	100
¼ inch screen	97-100
No. 10 U.S.S. mesh sieve	95-100
No. 140 U.S.S.	15-35

Percentages shall be based on dry weight of the sample.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine rough grades and installation conditions. Do not start topsoil work until unsatisfactory conditions are corrected.

3.02 FINISH GRADING:

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- A. Perform topsoiling within contract limits, including adjacent transition areas, to new elevations, levels, profiles, and contours indicated. Provide uniform levels and slopes between new elevations and existing grades.
- B. Grade surfaces to assure areas drain away from building structures and to prevent ponding and pockets of surface drainage.
- C. Lawn Areas: Supply and spread topsoil to a minimum uniform depth of 4" or as noted. Remove vegetation, deleterious material and clumps and stones larger than 1" in diameter.
- D. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture ready to accept seed or sod.
- E. Provide earth crowning where indicated on drawings.
- F. Crowning/mounding to be free flowing in shape and design, as indicated, and to blend into existing grades gradually so that toe of slope is not readily visible. Landscape Architect to verify final contouring before planting.
- G. Regardless of finish grading elevations indicated, it is intended that grading be such that proper drainage of surface water will occur and that no low areas are created to allow ponding. Contractor to consult with Owner or Landscape Architect regarding minor variations in grade elevations before rough grading is completed.

3.03 CLEANING:

- A. Upon completion of topsoiling operations, clean areas within contract limits, remove tools and equipment. Site shall be clear, clean, free of debris and suitable for site work operations.

END OF SECTION 32 0515

SECTION 32 1216 - ASPHALT PAVING

PART 1- GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and General and Supplemental Requirements. Which are hereby made a part of this section.

1.02 WORK INCLUDED:

- A. Plant mixed hot mix asphalt (HMA) consists of asphalt binder, aggregates, mineral filler and other additives. Refer to construction documents for additional requirements for producing, furnishing, and installing HMA.
- B. All provisions of section 501 of the 2012 Michigan Department of Transportation (MDOT) Standard Specifications of Construction shall apply except as stated herein.

1.03 SECTION INCLUDES:

- A. HMA paving
- B. HMA patching
- C. HMA paving overlays
- D. MDOT 2012 Standard Specifications for Construction (MDOT)
- E. American Society of Testing Materials (ASTM)

1.04 QUALITY ASSURANCE

- A. Quality control for HMA pavements shall be in accordance with Section 503 of the 2012 MDOT Standard Specifications for Construction.
- B. Submit proposed mix designs for each HMA mix prior to commencement of work. Follow the *Procedures Manual for Mix Design Processing* for all mix designs. Provide written certification that the materials used in the mixture are from the same source as those used in developing the mix design and that each material item meets specified requirements.
- C. Testing, as required, will be performed by the owner/construction engineer in accordance with Section 504 of the 2012 MDOT Standard Specifications for Construction.
- D. HMA materials not complying with specified requirements shall be repaired or removed and replaced with new paving.

1.05 WEATHER LIMITATIONS

- A. Section 502 of the MDOT 2012 Standard Specifications for Construction shall govern.
- B. Do not place HMA or apply bond coat when precipitation is imminent or when moisture on the existing surface will prevent satisfactory curing.

PART 2- PRODUCTS

2.01 MATERIALS

- A. Coarse aggregate shall consist of crushed stone, crushed gravel, a mixture of uncrushed gravel with either crushed stone or crushed gravel, or other inert material having similar characteristics. It shall be composed of clean, tough, durable fragments free from an excess of flat or elongated pieces and shall be free of organic matter and deleterious substances and meet the requirements of Division 9 in the MDOT 2012 Standard Specifications for Construction.
- B. Fine aggregate shall be well graded from coarse to fine and consist of natural sand, stone screenings, or a blend of natural sand and stone screenings. It shall be composed of rough surfaced and angular grains of quartz or other hard durable rock and meet the requirements of Division 9 in the MDOT 2012 Standard Specifications for Construction.
- C. HMA surface course shall be a mixture of 4.5 percent to 7.0 percent viscosity graded Asphalt Cement 5E1 (85/100 penetration grade) meeting the requirements of Division 5 in the MDOT 2012 Standard Specifications for Construction for aggregate gradation and HMA. Recycled asphalt products (RAP) are not allowed in surface course mixes.
- D. HMA leveling course shall be a mixture of 3 percent to 6 percent viscosity graded Asphalt Cement 4E1 (85/100 penetration grade) meeting the requirements of Division 5 in the MDOT 2012 Standard Specifications for Construction for aggregate gradation and HMA.
- E. Bond Coat material shall be SS-1h or CSS-1h emulsified asphalt, Grade RS-2 and shall conform with the requirements specified in Section 904 of the 2012 MDOT Standard Specifications for Construction.

PART 3 EXECUTION

3.01 Base Preparation

- A. Subgrade preparations shall consist of the final machining of the subgrade immediately prior to placing the bituminous base course. The surface shall be true to line and grade. Proof-roll all areas to receive the base course to locate all soft surface areas. Replace soil that deflects and will not compact with acceptable fill material and compact such fill in accordance with these Specifications.
- B. Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

3.02 HMA PLACEMENT

- A. HMA pavement construction methods shall conform to 502.03.F of the MDOT 2012 Standard Specifications for Construction.

3.03 LINE AND GRADE

- A. The contractor shall be responsible to provide construction layout to establish the line and grade from the construction plans.

3.04 BOND COAT APPLICATION

- A. The bond coat shall be applied with a pressure distributor and applied uniformly to horizontal and vertical surfaces abutting new HMA pavement at a rate of 0.10-gallons per square yard.
- B. The bond coat shall be applied sufficiently in advance of the laying of the wearing surface to permit drying but shall not be applied so far in advance or over such an area as to lose its adhesiveness as a result of being covered with dust or other foreign material. Suitable precautions shall be taken by the Contractor to protect the surface while the bond coat is drying and until the wearing surface is applied.

3.05 GENERAL TRANSPORTING, SPREADING AND FINISHING

- A. Section 502 of the MDOT 2012 Standard Specifications for Construction shall govern.

3.06 EQUIPMENT

- A. Section 502 of the MDOT 2012 Standard Specifications for Construction shall govern.

3.07 PLACING AND COMPACTION

- A. Section 502 of the MDOT 2012 Standard Specifications for Construction shall govern.
- B. Protect newly placed HMA after final rolling. Do not permit vehicular traffic on the asphalt pavement until it has properly cured, and in no case sooner than six hours after compaction.

3.08 MINIMUM QUALITY REQUIREMENTS

- A. Test the in-place HMA base, leveling, and surface courses for compliance with the requirements for density, thickness, and surface smoothness. Take not less than 3 inches diameter pavement specimens of each completed course, as specified under Field Quality Control for in-place Work, from locations as directed by the testing Engineer. Repair holes from test specimens as specified for patching defective Work.
- B. Core pavement to determine in-place compacted thickness and compare to cross-sectional pavement detail on the plans. Any thickness less than plan is not acceptable and will require replacement of the asphalt with no additional payment. Test in-place density according to ASTM D-2950.
- C. Each HMA course shall be tested for smoothness, using a 10-foot straightedge applied parallel with and at right angles to centerline of paved area according to MTM 722. Surfaces shall not be acceptable if exceeding the tolerances set forth in Section 502 of the MDOT 2012 Standard Specifications for Construction.

3.09 EXISTING DRAINAGE

- A. Do not block road drainage. Maintain shoulders, gutters and ditches affected by construction operations to carry drainage flows.

3.10 TEMPORARY REPAIRS

- A. Where it is not feasible to replace pavements immediately after completion of the excavation and backfill, furnish, and place crushed stone or gravel as required to maintain traffic until the pavement can be restored. Continuously maintain the temporary crushed stone or gravel surfaces in a smooth condition, free of potholes or ruts, until the permanent pavement is restored.
- B. Restore permanent pavement within 30 days after the existing pavement has been cut.

3.11 COLD MILLING (ALTERNATE NO. 2)

- A. Clean existing pavement surface of deleterious material immediately before cold milling.
- B. Remove existing asphalt pavement and minimum 1" of aggregate base by cold milling to grades and cross sections indicated.
- C. Mill to a uniform finished surface free of gouges, grooves, and ridges.
- D. Control rate of milling to prevent tearing of existing asphalt course.
- E. Repair or replace curbs, manholes, and other construction damaged during cold milling.
- F. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled asphalt.
- G. Transport milled hot-mix asphalt to asphalt recycling facility.

3.12 PULVERIZING / BASE CRUSHING (ALTERNATE NO. 2)

- A. Work shall be performed in accordance with Section 305 of the MDOT 2012 Standard Specifications for Construction.
- B. After crushing, 95 percent of the crushed material shall have a maximum particle size of 1-1/2 inches, with no particle size exceeding 4 inches.
- C. Pulverized material shall be graded and shaped to match the grades shown on the plans, or to provide positive drainage towards a storm water collection area where grades are not provided.
- D. Excess crushed material, if suitable, may be used as base or shoulder aggregate.

3.13 HMA PATCHING / REPAIRS

- A. Vertically sawcut full depth and along straight lines around deteriorated pavement and into adjacent sound pavement.
- B. Remove deteriorated pavement without damaging sawcut edges and dispose of legally offsite. Damaged edges shall be re-sawcut.
- C. Repair or replace curbs, structures, and other construction damaged during pavement excavation.
- D. Use 21AA material as specified and recompact to bring aggregate base course to bottom of existing pavement section.

- E. Use appropriate mechanical or hand placement equipment to install HMA in lifts not to exceed 2" compacted in place.
- F. Patching / repair HMA material shall consist of appropriate base, leveling, and wearing course mixes, to be approved by the owner prior to installation.
- G. Install necessary leveling wedges in compacted lifts not exceeding 2 inches thick.
- H. Use hot-applied joint sealant to seal joints around pavement repair.

END SECTION 32 1216

SECTION 32 1723 - PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 SECTION INCLUDES

- A. Furnishing and applying permanent pavement markings.

1.03 DESCRIPTION OF WORK

- A. Provide all materials, labor, equipment, and services necessary to complete all traffic lane and parking lot striping as indicated in the Construction Documents.
- B. Work includes, but not limited to painting of letters, markings, stripes and islands on the pavement surface applied in accordance with this Section and at the locations shown on the Plans or as directed by the Engineer.

1.04 QUALITY ASSURANCE

- A. All work under this section shall be performed in accordance with the current 2012 MDOT Standard Specifications for Construction, unless otherwise indicated on the drawings.
- B. All physically handicapped / barrier free markings shall be in accordance with current ADA requirements and the current Michigan Barrier Free Graphics Design Manual.
- C. Each paint container shall be clearly marked showing the name and address of manufacturer, description of material, date of packaging, and volume and weight of contents.
- D. Use only personnel completely trained and experienced in installation of materials and equipment.

1.05 SUBMITTALS

- A. Manufacturer's literature: Submit descriptive product data of materials, installation methods and procedures.
- B. Certification of compliance: Furnish a certification from manufacturer that material for this project has been sampled, tested and complies with requirements of specifications.

PART 1 PRODUCTS

1.01 MATERIALS

- A. The paint shall meet the specifications set forth in Section 920 of the 2012 MDOT Standard Specifications for Construction, unless otherwise indicated on the drawings.
- B. Color shall be as Specified on the Plans or as follows:

<u>Striping Item</u>	<u>Color</u>	<u>Stripe Width</u>
1. Standard Parking Stalls	Yellow	4 inches
2. Barrier Free Parking Stalls and Graphic Symbol	Blue	4 inches
3. Barrier Free Access Areas	Blue	4 inches

PART 2 EXECUTION

2.01 WEATHER LIMITATIONS

- A. The painting shall be performed only when the existing surface is dry and clean, when the minimum atmospheric temperature is in accordance with Table 811-2 of the 2003 MDOT Standard Specifications for Construction, and when the weather is not excessively windy, dusty or foggy.

2.02 EQUIPMENT

- A. All equipment for the Work shall be approved by the Contractor and shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, and such auxiliary hand painting equipment as may be necessary to satisfactorily complete the job.
- B. The mechanical marker shall be an approved self-propelled marking machine suitable for application of traffic paint. It shall produce an even and uniform film thickness at the required coverage and shall be designed so as to apply markings of uniform cross-sections and clear-cut edges without running or spattering and within the limits for straightness set forth herein.
- C. Suitable adjustments shall be provided on the sprayer/sprayers of a single machine or by furnishing additional equipment for painting the width required.

2.03 PREPARATION OF EXISTING SURFACE

- A. Immediately before application of the paint, the existing surface shall be cleaned, dry and entirely free from dirt, grease, oil, acids, laitance, or other foreign matter which could reduce the bond between the coat of paint and the pavement. Areas which cannot be satisfactorily cleaned by brooming and blowing shall be scrubbed as directed with a water solution of tri-sodium phosphate or an approved equal solution. After scrubbing, the solution shall be rinsed off and the surface dried prior to painting.

- B. Existing markings or stripes, which are to be abandoned or removed, shall be obliterated or obscured by the best methods suited for the purpose and to the satisfaction of the Owner.

2.04 LAYOUTS AND ALIGNMENT

- A. The Contractor is responsible for laying out proposed striping, which is to be approved by the Owner, before the Contractor is to proceed with the striping procedure. The Contractor is to ensure that all subsequent striping meets the quality of the approved application.
- B. On those sections of pavements where no previously applied figures, markings, or stripes are available to serve as a guide, suitable layouts and lines of proposed stripes shall be spotted in advance of the paint application. Control points shall be spaced at such intervals as will ensure accurate location of all markings.
- C. The Contractor shall provide an experienced Technician to supervise the location, alignment, layout, dimensions and application of the paint.

2.05 APPLICATION

- A. Markings shall be applied at the locations and to the dimensions and spacing indicated on the Plans or as specified. Paint shall not be applied until the indicated alignment is laid out and the conditions of the existing surface have been approved by the Owner.
- B. The paint shall be mixed in accordance with the manufacturer's instructions before application. The paint shall be thoroughly mixed and applied to the surface of the pavement with the marking machine at its original consistency without the addition of thinner. If the paint is applied by brush, the surface shall receive 2 coats; the first coat shall be thoroughly dry before the second coat is applied.
- C. Prior to marking of the pavement, 14 days shall elapse from the application of the bituminous seal coat, slurry seal or the placement of the HMA surface course.
- D. In the application of straight stripes, any deviation in the edges exceeding 1/2-inch in 50-feet shall be obliterated and the marking corrected. The width of the markings shall be as designated within a tolerance of 5 percent.

2.06 PROTECTION

- A. After applications of the paint, all markings shall be protected while the paint is drying. The fresh paint shall be protected from injury or damage of any kind. The Contractor shall be directly responsible and shall erect or place suitable warning signs, flags, or barricades, protective screens or coverings as required. Markings defaced by traffic or pedestrians shall be reinstalled at the contractor's expense.

END SECTION 32 1723

SECTION 32 3115 - WOOD FENCES AND GATES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 WORK INCLUDED:

- A. All labor, material, and equipment necessary for, and incidental to proper completion of all fencing installation. Location and extent of fencing as shown on drawings.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

1. Section 03 3300: Cast-in-Place Concrete
2. Section 31 2200: Grading
3. Section 32 3132 - Wood Composite Fences and Gates (Alternate 3)
4. Section 32 9219: Seeding (Alternate 1)
5. Section 32 9223: Sodding (Base Bid)
6. Section 32 9300: Trees, Plants and Ground Covers

1.04 REFERENCE STANDARDS:

- A. NFPA, National Forest Products Association - National Design Specification for stress grade lumber and its fastenings.
- B. Lumber: Comply with American Softwood Lumber Standard PS-20-70. Provide species complying with grading rules of the following associations. Provide lumber grading agency certificate of inspection and grade compliance, with each shipment.
 1. Southern Pine: Standard Grading Rules for Southern Pine Lumber, published by Southern Forest Products Association (SFPA).
 2. Standard Grading Rules for Southern Pine Lumber (2014, or current edition published by Southern Pine Inspection Bureau (SPIB).
 3. Western Red Cedar: Western Lumber Grading Rules, published by Western Wood Products Association (WWPA), or Standard Grading Rules published by West Coast Lumber Inspection Bureau (WCLIB).
- C. Lumber Treatment: Comply with American Wood Protection Association (AWPA) Standards for Wood Preservative Treatment Scheduled.
- D. Hot-Dip Zinc Galvanizing Coating for fasteners, connectors, anchors and accessories, ASTM, A-153.

1.05 QUALITY ASSURANCE:

- A. Shop pressure treat, precut, drill and line dry or air-seasoned all wood members as required, and deliver to job site ready for installation.

- B. Identify lumber with a grade stamp of an agency certified by SFPA.
- C. All metal components to meet applicable ASTM standards, and recommendations of the American Zinc Institute.

1.06 SUBMITTALS:

- A. Submit complete shop drawings for entire wood fencing assembly indicating all dimensions, grades of wood, component profile, drilled holes, fasteners, connectors, erection details, etc.
- B. Submit certification that required grade or lumber has complied with specification requirements.
- C. Sample Panel: Before starting wood fencing provide a sample panel using materials indicated for the project work. Build one full fence section at the site at full height. Correct and rebuild sample panel until Architect's acceptance of the work. Retain panel during construction as a standard for completed wood fencing work.
 - 1. The approved sample panel may be a finished section of the work and remain in place. Location as directed by the Architect.
 - 2. Sample panel, if not utilized as a finished section, shall be removed by this contractor.

1.07 DELIVERY, STORAGE AND HANDLING:

- A. Deliver, store and handle all wood members with care during shipping and installation to maintain undamaged and unmarked exposed faces. Damage members will be rejected.
- B. All lumber shall be protected from the weather and elements.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. Fence Posts:

- 1. All wood shall be 4" x 4" pressure treated Southern Pine, No. 2 grade, in accordance with Standard Grading Rules for Southern Pine as published by Southern Pine Inspection Bureau (SPIB).
- 2. All lumber shall be kiln dried, to moisture content of not more than 19%, free from shakes, large or loose knots which might repair strength or durability of lumber.
- 3. Discard any pieces bowed, warped, twisted, or checked to the extent of causing a detrimental effect.

B. Rails:

- 1. All railings shall be 2" x 6" Western Red Cedar, S4S, D clear grade, in accordance with grading rules of (WCLIB) and (WWPA).

2. All lumber shall be kiln dried, to moisture content of not more than 19%, before and after pressure treatments, free from shakes, large or loose knots, cracks of other imperfections.
 3. Discard any pieces bowed, warped, twisted, or checked to the extent of causing a detrimental effect.
- C. Nails:
1. Double Hot Dipped Zinc Galvanized coating Maze 'Stormguard' nails with spiral shank. Manufactured by Maze Nails, Peru, Illinois 61354.
- D. Concrete: ASTM C94 ready-mixed concrete minimum 28 day compressive strength of 2.500 psi, air entrained 2% to 4%.
- E. Drainage Fill: MDOT 6A (3/8" to 3/4") clean uniformly graded natural aggregate, no fines.

PART 3 - EXECUTION

3.01 INSPECTION:

- A. Examine final grade and installation conditions. Do not start wood fencing work until unsatisfactory conditions are corrected. Should work commence prior to corrective measures being completed any adjustments or modifications to wood fencing shall be the responsibility of this contractor and cost for these modifications shall be borne by this contractor.

3.02 LAYOUT:

- A. Layout complete fence line. Locate and mark post positions. Space line posts equally and at maximum of 6'-0" on center spacing, unless otherwise specified on the drawings. Layout shall be approved by Architect prior to initiating fence construction.

3.03 INSTALLATION:

- A. Install wood fencing of the type, design, and height indicated on the drawings.
- B. Drill post holes into firm undisturbed or compacted earth.
 1. Install 12" diameter x 42" depth concrete footings for all solid gate and line posts. Bell bottom of footing as indicated on the drawings.
- C. Align and plumb each post both vertically and laterally. Secure in position during concrete and earth fill placement.
- D. Install railings and fencing materials as indicted on drawings and specified herein.
- E. Use only sound, thoroughly seasoned materials of the longest practical lengths and sizes to minimize jointing. Use materials free from warp which cannot be easily corrected by anchoring and attachment.
- F. Securely attach work to substrates by anchoring and fastening as required to provide a rigid finished fence structure.

- G. Set work accurately to required level and lines, with members plumb and true, and accurately cut and fit.
- H. Brush apply 2 coats of wood preservative to surface of preservative treated materials which have been field cut, dressed or drilled.

3.05 CLEANING:

- A. Perform cleaning during installation of work and upon completion of the work. Remove from site all debris and equipment. Repair all damage resulting from wood fencing installation at this contractor's expense.

END OF SECTION 32 3115

SECTION 32 3119 – DECORATIVE METAL FENCES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions Sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK

- A. All labor, material, and equipment necessary for, and incidental to proper completion of all fencing installation. Location and extent of fencing as shown on drawings.
- B. Fence components (i.e. pickets, rails, posts, and hardware) shall be as manufactured by Ameristar Fence Products. Model: Montage Plus, or approved substitute.
- C. Related Work Specified Elsewhere:
 - 1. Section 03 3300: Cast in Place Concrete
 - 2. Section 32 3216: Segmental Retaining Wall
 - 2. Section 32 9353: Plants, Preparation and Accessories

1.03 QUALITY ASSURANCE

- A. Manufacturer's: As approved by Owner's Representative and Landscape Architect.
- B. Fabrication and Installation: Fabricator and installer shall be a subcontractor with not less than five years of successful experience in the required types of metal fabrication and installation procedures.
- C. Welding: Welding shall conform to AWS, American Welding Society Standards.

1.04 SUBMITTALS

- A. Shop drawings: Details of fabrication, installation footings, brackets and hardware, and methods of installation.
- B. Manufacturer's Literature.
- C. Certificates: Manufacturer's certification that materials meet the specification requirements.
- D. Brackets, anchors and hardware.
- E. Powdercoat finished mock-up sample of 4' fence section of each specified fence type.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials with manufacturer's tags and labels intact.
- B. Handle and store so as to avoid damage.
- C. All equipment parts and material shall be new.

1.06 WARRANTY

- A. All structural fence components (i.e. rails, pickets, posts and hardware) shall be guaranteed against defects in material finish, including cracking, peeling, chipping, blistering or corroding for 10 (ten) years from time of final acceptance. Contractor to remedy any unsatisfactory conditions during guarantee period at no cost to owner.

PART 2 - PRODUCTS

Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved substitute:

A. BASIS-OF-DESIGN

AMERISTAR Montage Plus® *Welded and Rackable* (ATF – All Terrain Flexibility) Ornamental Steel, Majestic design, extended picket bottom rail treatment, (~~3-Rail~~) majestic style top, including but not limited to panels, posts and hardware as manufactured by Ameristar Fence Products, Inc., in Tulsa, Oklahoma.

2.02 MATERIAL

- A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310 MPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.60 oz/ft² (184 g/m²), Coating Designation G-60.
- B. Material for pickets shall be 3/4" square x 18 Ga. tubing. The rails shall be steel channel, 1.50" x 1.50" x .14 Ga. Picket holes in the rail shall be spaced 4.675" on center. Fence posts shall be 2.50" square x 16 Ga.
- F. Powder Coating: A minimum six stage pretreatment/wash (with zinc phosphate), an electrostatic spray application of an epoxy base, and a separate electrostatic spray application of a polyester finish. The base coat shall be a thermosetting epoxy powder with a minimum thickness of 2 mils. The topcoat shall be a "nomar" TGIC polyester powder coat finish with a minimum thickness of 2 mils. Top coat color shall be gloss black.

2.03 FABRICATION

- A. Pickets, rails, and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.
- B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection.
- C. The manufactured panels and posts shall be subjected to an inline electrodeposition coating (E-Coat) process consisting of a multi-stage pretreatment/wash, followed by a duplex application of an epoxy primer and an acrylic topcoat. The minimum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be BLACK. The coated panels and posts shall meet or exceed the coating performance criteria of ASTM F2408).
- D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that all concrete is completed and approved by Owner's Representative and Landscape Architect prior to beginning fence and gate installation.
- B. Any unsatisfactory conditions shall be reported to the Owner's Representative and Landscape Architect immediately. Do not proceed with work under this section until unsatisfactory conditions are corrected.

3.02 PREPARATION

- A. Measure and layout and fencing locations per drawings.
- B. Coordinate all work with other subcontractors and other work.

3.03 FENCE INSTALLATION

- A. Completely install fencing with related hardware to conform with all approved shop drawings.
- B. Fencing shall be erected plumb, square and level, with all metal pre coated and welded in shape prior to installation. Welding shall be continuous in accordance with AWS Standards; and all joints shall be ground smooth and painted to match coating.

3.03 FENCE INSTALLATION MAINTENANCE

When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty.

3.04 CLEANING

- A. Remove all debris and excess material immediately from project site.
- B. Restore adjacent work by other contractors to its original condition.
- C. Leave project area clean, orderly, and free of any hazardous conditions.

END OF SECTION 32 3119

SECTION 32 3132 - WOOD COMPOSITE FENCES AND GATES (ALTERNATE NO. 3)

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 WORK INCLUDED:

- A. Provide all labor, materials, necessary equipment, and services to complete work, as indicated on the drawings, as specified herein or both, except as for items specifically indicated as "NIC ITEMS".

1.03 RELATED WORK SPECIFIED ELSEWHERE:

1. Section 31 2200: Grading
2. Section 03 3300: Cast-in-Place Concrete
3. Section 32 3115: Wood Fences and Gates (Base Bid)

1.03 REFERENCE STANDARDS:

- A. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
- B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- C. ASTM D 143 - Standard Test Methods for Small Clear Specimens of Timber.
- D. ASTM D 198 - Standard Test Methods of Static Tests of Lumber in Structural Sizes.
- E. ASTM D 1037 - Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials.
- F. ASTM D 1413 - Standard Test Method for Wood Preservatives by Laboratory Soil-Block Cultures.
- G. ASTM D 1761 - Standard Test Methods for Mechanical Fasteners in Wood.
- H. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics.
- I. ASTM D 2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine.
- J. ASTM D 2394 - Standard Methods for Simulated Service Testing of Wood and Wood-Base Finish Flooring.
- K. ASTM D 2395 - Standard Test Methods for Specific Gravity of Wood and Wood-Based Materials.
- L. ASTM D 4761 - Standard Test Methods for Mechanical Properties of Lumber and Wood-Base Structural Material.

M. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

N. ASTM F 1679 - Standard Test Method for Using a Variable Incidence Tribometer (VIT). American Wood Protection Association (AWPA) Standards for Wood Preservative Treatment Scheduled.

1.2 DESIGN / PERFORMANCE REQUIREMENTS

A. Design Requirements: Design fence system to withstand Miami/Dade County 110 MPH steady wind and 130 MPH gusting wind tests.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 3300.

B. Product Data: Manufacturer's data sheets on each product to be used indicating sizes, profiles, surface finishes, and performance characteristics, and including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.
4. Instructions on care and cleaning of composite wood products.

C. Verification Samples: For each finish product specified, two samples, minimum size 9 inches (229 mm) square, representing actual product, color, and patterns.

D. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

E. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for cleaning and maintenance.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products in accordance with the manufacturer's instructions.

B. Store level and flat, off ground or floor, with supports at each end and maximum 24 inches on center.

C. Do not stack wood composite over 8 feet (203 mm) high.

D. Cover wood composite with waterproof covering, vented to prevent moisture buildup.

1.5 WARRANTY

A. Provide manufacturer's 25 year residential warranty / 10 year commercial warranty providing coverage against checking, splitting, splintering, rotting, structural damage from termites, and fungal decay of wood composite.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Trex Fencing.

B. Substitutions: Not permitted.

2.2 MATERIALS

- A. Wood composite: Reclaimed wood and plastic with integral coloring; free from toxic chemicals and preservatives:
1. Characteristics:
 - a. Abrasion resistance: 0.01 inch wear per 1000 revolutions, tested to ASTM D 2394.
 - b. Hardness: 1124 pounds, tested to ASTM D 143.
 - c. Self ignition temperature: 743 degrees F, tested to ASTM D 1929.
 - d. Flash ignition temperature: 698 degrees F, tested to ASTM D 1929.
 - e. Flame spread rating: 80, tested to ASTM E 84.
 - f. Water absorption, 24 hour immersion, tested to ASTM D 1037:
 - 1) Sanded surface: 4.3 percent.
 - 2) Unsanded surface: 1.7 percent.
 - g. Thermal expansion coefficient, 36 inch long samples:
 - 1) Width: 35.2×10^{-6} to 42.7×10^{-6} .
 - 2) Length: 16.1×10^{-6} to 19.2×10^{-6} .
 - h. Fastener withdrawal, tested to ASTM D 1761:
 - 1) Nail: 163 pounds per inch.
 - 2) Screw: 558 pounds per inch.
 - i. Static coefficient of friction:
 - 1) Dry: 0.53 to 0.55, tested to ASTM D 2047.
 - 2) Dry: 0.59 to 0.70, tested to ASTM F 1679.
 - 3) Wet: 0.70 to 0.75, tested to ASTM F 1679.
 - j. Fungus resistance, white and brown rot: No decay, tested to ASTM D 1413.
 - k. Termite resistance: 9.6 rating, tested to AWPA E-1.
 - l. Specific gravity: 0.91 to 0.95, tested to ASTM D 2395.
 - m. Compression:
 - 1) Parallel: 1806 PSI ultimate, 550 PSI design, tested to ASTM D 198.
 - 2) Perpendicular: 1944 PSI ultimate, 625 PSI design, tested to ASTM D 143.
 - n. Tensile strength: 854 PSI ultimate, 250 PSI design, tested to ASTM D 198.
 - o. Shear strength: 561 PSI ultimate, 200 PSI design, tested to ASTM D 143.
 - p. Modulus of rupture: 1423 PSI ultimate, 250 PSI design, tested to ASTM D 4761.
 - q. Modulus of elasticity: 175,000 PSI ultimate, 100,000 PSI design, tested to ASTM D 4761.
 - r. Thermal conductivity: 1.57 BTU per inch per hour per square foot at 85 degrees F, tested to ASTM C 177.

2.3 COMPONENTS

- A. Fence System: Seclusions Privacy Fence System.
1. Fence height:
 - a. 4 feet; overall post height. See typical detail.
 2. Components:
 - a. Fence post 4' x 4" pressure treated
 - b. Post sleeves: 4" x 4" x 108"; cut to receive finished grade
 - c. Post caps: 4" x 4" Flat.

- d. Railings: 2" x 6" square edge board
- 3. Color: By owner, submit samples of each component for approval.

2.4 ACCESSORIES

- A. Fasteners: 1-5/8 inch galvanized or corrosion-resistant coated steel. Provide finish nails where applicable.
- B. Concrete: Provide concrete conforming to ASTM C 94; minimum 2500 PSI compressive strength at 28 days, with a 3 to 5 inch slump.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Cut and drill wood composite using carbide tipped blades.
- C. Space posts maximum 6 feet on center, unless otherwise noted. See drawings.
- D. Drill post holes into undisturbed or compacted soil; excavate deeper in soft or loose soils and for posts with heavy lateral loads.
- E. Drill posts to 12 inch diameter. Locate bottom of post 42 inches below grade
- F. Place top of concrete per typical detail.
- G. Cut rails to lengths required.
- H. Place post caps over post tops and secure with construction adhesive or four finish nails.

3.4 CLEANING

- A. Clean wood composite to remove stains:
 - 1. Mold, mildew, and berry and leaf stains: Clean surfaces with conventional deck wash containing detergent or sodium hypochlorite.

2. Rust and ground-in dirt: Clean surfaces with cleaner containing oxalic or phosphoric acid.
3. Oil and grease: Clean surfaces with detergent containing degreasing agent.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 32 3132

SECTION 32 3216– SEGMENTAL RETAINING WALLS

PART - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK:

- A. Extent of retaining walls is shown on drawings.
- B. Type of retaining walls required include the following:
 - 1. Segmental concrete masonry retaining walls with soil reinforcement.
- C. Related Work Specified Elsewhere:
 - 1. Section: 31 2200: Grading
 - 2. Section: 31 2216: Fine Grading
 - 3. Section: 32 0515: Soils for Exterior Improvements
 - 4. Section 33 4616.19: Pipe Underdrains

1.03 SYSTEM PERFORMANCE REQUIREMENTS:

- A. Structural Performance: Design, engineer and install segmental concrete retaining walls to withstand the effects of loads due to soil pressure resulting from grades indicated;
 - 1. Design retaining walls according to NCMA's "Design Manual for Segmental Retaining Walls".
- B. Engineering Responsibility: Engage a manufacturer who assumes undivided responsibility for engineering segmental concrete retaining walls by employing a Registered Professional Engineer specializing in structures in the State of Michigan.

1.04 QUALITY ASSURANCE:

- A. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Industry Standards: Comply with recommendations of National Concrete Masonry Association (NCMA) as applicable
- C. Installer Qualifications: Engage an experienced installer with a minimum of (5) years experience who has completed segmental retaining walls similar in material, design and extent to that indicated for Project that has resulted in construction with a record of successful in-service performance

1.05 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical data and other information for each retaining wall material or product required, including but not limited to soil reinforcement if required by engineer, and filter fabric.
- B. Shop Drawings: Submit shop drawings for approval indicating layout and construction of proposed retaining wall. Design drawings shall be prepared by manufacturer for segmental concrete retaining walls. Show height, length, profile, soil reinforcement, base and drainage fill.
 - 1. Include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Samples for Verification Purposes: Sets for each color, finish and pattern of concrete unit required. Include sample of concrete wall units showing the full range of variations expected for approval prior to ordering of concrete wall units.

1.06 PROJECT CONDITIONS:

- A. Test borings and other exploratory operations may be performed by Retaining Wall Contractor, at the Retaining Wall Contractor's option; however, no change in the contract sum will be authorized for such additional exploration.
- B. Protection: Protect existing structures, utilities, sidewalks, pavements and other facilities in areas of work. Barricade open excavations and provide warning lights. Comply with regulations and requirements of authorities having jurisdiction.

1.07 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials to project site in an undamaged condition.
- B. Store and handle retaining wall units and related materials to prevent deterioration or damage due to moisture, temperature changes, contaminants, corrosion, breaking, chipping or other causes.
- C. Store accessories to prevent corrosion and accumulation of dirt or oil
- D. Store and handle geotextiles according to ASTM D 4873.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS:

- A. Base: Gravel or crushed stone, 21AA crushed limestone, or approved substitute.
- B. Drainage Fill. 6A (3/8" to 3/4") natural aggregate, no fines.
- C. Soil Reinforcement: Geogrid specifically manufactured for use as soil reinforcement and with necessary properties to comply with performance requirements.
- D. Filtration/Separation Fabric: Manufacturer's non-woven geotextile fabric of polypropylene or polyester fibers, or a combination thereof.
 - 1. Terrafix 270R
 - 2. Mirafi 160 N

1.02 SEGMENTAL CONCRETE MASONRY MATERIALS:

- A. Segmental Concrete Masonry Units: Provide manufacturer's standard high-strength, regular-weight concrete units, designed for use in segmental retaining walls, complying with ASTM C 90, except with net area compressive strength of 3000 psi for average of 3 units and 2500 psi for individual unit, maximum water absorption of 8 percent, and variation in height limited to 1/16 inch.
1. Provide units with lugs, projections, or holes and pins that locate successive courses in relation to the course below and maintain that alignment as backfill is placed, and that interlock with units above and below.
 2. Shapes: Provide units of basic shapes and dimensions indicated.
 3. Exposed Faces: Manufacturer's standard split or rock face. Color selected by Landscape Architect.
 4. Special Units: Provide special corner, end and cap units, and other special shapes as necessary matching exposed faces of segmental concrete masonry units.
 5. Manufacturer: Provide one of the following:
 - a. Fendt Builders Supply (734) 663-4277 (Basis of Design)
 - b. Versa Lok Midwest (651) 770-3166
 - c. Unilock (248) 437-7037
- B. Connecting Pins: Manufacturer's standard non-corrosive nylon fiberglass reinforced units.
- C. Concrete Adhesive: Manufacturer's standard formulated to adhere cap units to segmental concrete masonry wall construction.

PART 3 - EXECUTION

3.01 EXCAVATION:

- A. Excavate to required depth and configuration as specified on the drawings.
- B. Compact top 12 inches below subgrade to not less than 95 percent maximum density in accordance with ASTM D 1557.
- C. Construct leveling pad on compacted subgrade for segmental retaining walls not less than 6 inches thick extending not less than 6 inches from front and back of initial course. Use specified granular fill material, and compact to not less than 95 percent maximum density in accordance with ASTM D 1557.

3.02 SEGMENTAL CONCRETE RETAINING WALLS:

- A. General: Place units according to manufacturer's written instructions and in accordance with Design Drawings. Lay units in running bond, overlapping half units of course below.

1. Form corners and ends by using manufactured special units.
- B. First Course: Place first course of retaining wall units on leveling base/course for full length of wall. Place units in firm contact with each other, properly aligned and level.
1. Tamp units into leveling base as necessary to bring tops of units into a level plane.
 2. Place and compact drainage fill as indicated to top of first course. Place fill on both sides of wall at same time without disturbing alignment of units. Fill voids between and within units with drainage fill.
- C. Subsequent Courses: Sweep excess fill from tops of course below. Place units in firm contact, properly aligned, and directly on course below:
1. Carefully align holes in units above with holes below and insert pins according to manufacturer's written instructions.
 2. Place and compact fill as each course is laid. Place fills on both sides of wall at same time, where both sides are indicated to be filled.
 3. Fill voids between and within units with drainage fill.
 4. Verify subsequent courses are level.
- D. Cap Units: Place cap units and secure with cap adhesive according to manufacturer's written instructions.

3.03 BACKFILL:

- A. Backfill retaining walls promptly as work progresses.
- B. Prepare ground surface to receive fill by removing vegetation, debris, unsatisfactory soil materials and obstructions. Scarify as required so that fill material will bond with existing surface.
- C. Place specified and referenced soil material in layers to required subgrade elevations.
- D. Place backfill soil materials in layers not more than 8 inches in loose depth, compacting each layer to specified density. Do not place fill or backfill materials on surfaces that are muddy, frozen or contain ice or frost.
- E. Place, spread and compact fill in uniform lifts for full width and length of embankment as wall is laid. Begin at back of wall and place and spread fill toward embankment.
1. Use only hand-operated compaction equipment within 36 inches of wall.
 2. Compact drainage fill to not less than 95 percent maximum dry density according to ASTM D 1557.
 3. Compact reinforced soil fill to not less than 95 percent maximum dry density according to ASTM D 1557.

- F. Place soil reinforcement in horizontal joints of retaining wall according to soil reinforcement manufacturer's written instructions. Embed reinforcement a minimum of 8 inches into retaining wall and stretch tight over compacted backfill. Anchor soil reinforcement before placing fill on it.
 - 1. Use additional soil reinforcement at corners and curved walls to provide continuous reinforcement and to comply with manufacturer's written instructions.
 - 2. Before compacting, place sufficient depth of fill over reinforcement to produce compacted depth of 4 inches for wheeled vehicles or 6 inches for tracked vehicles.
 - 3. Do not turn vehicles on fill until first layer of fill is compacted and second layer is placed over each soil-reinforcement layer.
- G. Coordinate backfill placement with installation of Underdrainage System specification Section 02715.
- H. Rough grade to allow for place of topsoil specification in Section 32 0515.

3.04 MAINTENANCE:

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded and rutted or otherwise damaged areas. In damaged compacted areas, scarify surface, reshape and compact to required density prior to further construction.

3.05 DISPOSAL OF EXCESS AND WASTE MATERIALS:

- A. Remove trash, debris excess soil materials and waste materials and legally dispose of off owner's property.

END OF SECTION 32 3216

SECTION 32 8423 UNDERGROUND SPRINKLERS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to the Bidding and Contract Requirements and General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK

- A. Furnish all labor, materials, supplies, equipment, tools, and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the irrigation system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein. The system shall be constructed to grades and conform to areas and locations as shown on the drawings. Removal and or restoration of existing improvements, excavation and back-fill, and all other work in accordance with plans and specifications are required.
- B. Extent of irrigation system work is shown on drawings and by provisions of this Section.
- C. Sprinkler lines shown on the drawings are essentially diagrammatic. Spacing of the sprinkler heads or quick coupling valves are shown on the drawings and shall be exceeded only with the permission of the Owner's authorized representative.
- D. Items of work specifically included are:
 - 1. Procurement of all applicable licenses, permits, and fees.
 - 2. Coordination of all utilities.
 - 3. Connection of electrical power supply to the irrigation control system.
 - 4. Connection of water source/supply to the irrigation system.
 - 5. Maintenance period.
 - 6. Sleeving for irrigation pipe and wire.
- E. Related work specified elsewhere
 - 1. Section 02 3000: Subsurface Investigation
 - 2. Section 31 2200: Grading
 - 3. Section 32 9219: Seeding (Alternate 1)
 - 4. Section 32 9223: Sodding (Base Bid)
 - 5. Section 32 9300: Plants, Preparation & Accessories

1.03 QUALITY ASSURANCE

- A. The "Contractor" shall maintain continuously a competent superintendent, satisfactory to the Owner, with authority to act for him in all matters pertaining to the work.
- B. The "Contractor" shall coordinate his work with the other trades
- C. The "Contractor" shall confine his operations to the area to be improved and to the areas allotted him by the Owner's representative for material and equipment storage.

- D. The “Contractor” shall have a minimum of 5 years experience installing irrigation systems of comparable size and complexity.

1.04 SUBMITTALS

- A. Submit samples under provisions of Section 01300-Submittals.
- B. Materials List: Include backflow device, valves, valve boxes, sprinklers, controller, rain sensors, wire, wire connectors, pipe, fittings and clamps to be used on the project prior to purchasing materials. Quantities of material need not be included.
- C. Manufacturer’s Data: Submit manufacturer’s catalog cuts, specifications, and operating instructions for equipment shown on the materials list.
- D. Shop Drawings: Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Landscape Architect. Include instruction sheets and parts lists for all operating equipment.
- E. Project Record (As-Built) Drawings
 1. Submit record drawings under provisions of Section 017000 – “Contractor” Closeout, Record Documents.
 2. Record pipe and wiring network alterations. Record work that is installed differently than shown on the construction drawings. Record which valve operates which area by “clouding” or encircling the area and placing the correct valve number and controller identification nearby. Record accurate reference dimensions, measured from at least two permanent reference points of each irrigation system valve, each controller or control unit, each sleeve end, each stub-out for future pipe or wiring connections, and other irrigation components enclosed within a valve box. Place all dimensions and notes on the same page as the drawing. Use arrows and legends when needed.
 3. Before construction completion, obtain from the engineer/landscape architect/owner’s representative an AutoCad file copy of the drawings. Using AutoCAD, duplicate information contained on the project drawings maintained on site. Label each sheet “Record Drawings”. Completion of the record drawings will be a prerequisite for the review at the completion of the irrigation system installation.

1.05 RULES AND REGULATIONS

- A. Work and materials shall be in accordance with the latest edition of the National Electric Code, the Uniform Plumbing Code as published by the Western Plumbing Officials Association, and applicable laws and regulations of the governing authorities.
- A. When the contract documents call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.
- B. If quantities are provided either in these specifications or on the drawings, these quantities are provided for information only. It is the “Contractor’s” responsibility to determine the actual quantities of all material, equipment, and supplies required by the project and to complete an independent estimate of quantities and wastage.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
- B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends either threaded or plain.
- C. Store and handle materials to prevent damage and deterioration
- D. Provide secure, locked storage for valves, sprinkler heads and similar components that cannot be immediately replaced, to prevent installation delays.

1.07 CODES AND STANDARDS

- A. The entire installation shall fully comply with all local and state laws and ordinances and with all established codes applicable thereto.
- B. Any permits for the installation or construction of the work included under this contract which are required by any of the legally constituted authorities having jurisdiction, shall be obtained and paid for by the "Contractor", each at the proper time. He shall also arrange for and pay all costs concerning any inspections and examinations required by these authorities.
- C. In all cases where inspection of the sprinkler system work is required and/or where portions of the work are specified to be performed under the direction and/or inspection of the Owner's authorized representative, the "Contractor" shall notify the Owner's authorized representative at least 24 hours in advance of the time and such inspection and/or direction is required.
- D. Any necessary re-excavation or alterations to the system needed because of failure of the "Contractor" to have the required inspections shall be performed at the "Contractor's" own expense.

1.08 TESTING

- A. Notify the engineer/landscape architect/owner's representative three days in advance of testing.
- B. Pipelines jointed with rubber gaskets or threaded connections may be subjected to a pressure test at any time after partial completion of backfill. Pipelines jointed with solvent-welded PVC joints shall be allowed to cure at least 24 hours before testing.
- C. Subsections of mainline pipe may be tested independently, subject to the review of the engineer/landscape architect/owner's representative.
- C. Furnish clean, clear water, pumps, labor, fittings, and equipment necessary to conduct tests or retests.
- D. Volumetric Leakage Test:
 - 1. Cap riser of mainline components for volumetric pressure tests. Backfill to prevent pipe from moving under pressure. Expose coupling and fitting.

2. Purge all air from the pipeline before test.
 3. Subject mainline pipe to the anticipated operating pressure of 100 PSI for two hours. Maintain constant pressure. The amount of additional water pumped in during the test shall not exceed 1.24 gallon per 100 joints of 3-inch diameter pipe and 1.6 gallons per 100 joint of 4-inch diameter pipe. Replace defective pipe, fitting, joint, valve, or appurtenance. Repeat the test until the pipe passes test.
 4. Cement or caulking to seal leaks is prohibited.
- E. Operational Test:
1. Activate each remote control valve in sequence from controller. The engineer/landscape architect/owner's representative will visually observe operation, water application patterns, and leakage.
 2. Replace defective remote control valve, solenoid, wiring, or appurtenance to correct operational deficiencies.
 3. Replace, adjust, or move water emission devices to correct operational or coverage deficiencies.
 4. Replace defective pipe, fitting, joint, valve, sprinkler, or appurtenance to correct leakage problems. Cement or caulking to seal leaks is prohibited.
 5. Repeat test(s) until each zone passes all tests.
 6. Repeat tests, replace components, and correct deficiencies at no additional cost to the owner.

1.09 CONSTRUCTION REVIEW

- A. The purpose of on-site reviews by the engineer/landscape architect/owner's representative is to periodically observe the work in progress, the "Contractor's" interpretation of the construction documents, and to address questions with regard to the installation.
- B. Scheduled reviews such as those for irrigation system layout or testing must be scheduled with the engineer/landscape architect's/owner's representative as required by these specifications.
- C. Impromptu reviews may occur at any time during the project.
- D. A review will occur at the completion of the irrigation system installation and project record (as-built) drawing submittal.

1.10 GUARANTEE/WARRANTY AND REPLACEMENT

- A. It shall be the "Contractor's" responsibility to ensure and guarantee satisfactory operation of the entire system and the workmanship and restoration of the area. The entire system shall be guaranteed to be complete and perfect in every detail for **a period of one year from the date of its final acceptance** and he hereby agrees to repair or replace any such defects occurring within that year, free of expense to the Owner. If final acceptance is not given the "contractor" will continue to be responsible for and maintain the irrigation system until acceptance is granted.
- B. Minor maintenance and adjustment shall be by the Owner.
- C. For a period of one year from commencement of the formal maintenance period, fill and repair depressions or settling more than one-quarter ($\frac{1}{4}$ "). Restore landscape or structural

features damaged by the settlement of irrigation trenches or excavation. Repair damage to the premises caused by a defective item.

- D. Make repairs within seven (7) days of notification from the engineer/landscape architect/owner's representative.
- E. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.
- F. Guarantee/warranty applies to originally installed materials, equipment, and replacements made during the guarantee/warranty period.

1.11 WINTERIZATION AND SPRING START-UP

- A. Coordinate the winterization and start-up with the landscape maintenance personnel.
- B. "Contractor" shall winterize the system each year until final acceptance is granted and throughout the warranty period as part of this contract. "Contractor" will provide written instructions to the Owner for future service and maintenance.
- C. Return to the site during the subsequent spring season and demonstrate to the Owner the proper procedures for the system start-up, operation, and maintenance. Repair any damage caused in improper winterization at no additional cost to the owner.
- D. After completion, testing and acceptance of the system, the "Contractor" will instruct the Owner's personnel in the operation and maintenance of the system.

PART 2 - MATERIALS

2.01 GENERAL

Use materials that are new and without flaws or defects of any type, and which are the best of their class and kind. All material overages at the completion of the installation are the property of the "Contractor" and are to be removed from the site.

2.02 SUBSTITUTIONS

The Contractor shall use materials as specified. Material other than specified will be permitted only after written application by the "Contractor" and written approval by the Landscape Architect. Substitutions will only be allowed when in the best interest of the Owner.

2.03 SLEEVING

- A. Install separate sleeve beneath paved areas to route each run of irrigation pipe or wiring bundle.
 - 1. Sleeving material beneath pedestrian pavements shall be PVC Class 160 pipe with solvent welded joints.
 - 2. Sleeving beneath drives and streets shall be PVC Class 160 pipe with solvent welded joints.
 - 3. Sleeving diameter: equal to twice that of the pipe or wiring bundle.

2.04 PIPE AND FITTINGS

- A. Mainline Pipe and Fittings:
1. Use rigid, unplasticized polyvinyl chloride (PVC) 1120, 1220 National Sanitation Foundation (NSF) approved pipe, extruded from material meeting the requirements of Cell Classification 12454-A or 12454-B, ASTM Standard D1784, with an integral belled end.
 2. Use Class 160, SDR-26, rated at 160 PSI, conforming to the dimensions and tolerances established by ASTM Standard D2241. Use PVC pipe rated at higher pressures than Class 160 in the case of small nominal diameters that are not manufactured in Class 160.
 3. Use rubber-gasketed pipe equipped with Reiber Gasket System for mainline pipe with a nominal diameter greater than 3-inches. Use rubber-gasketed deep bell ductile iron fitting conforming to ASTM A-536 and ASTM F-477. Use lubricant approved by the pipe manufacturer. Size slip fitting socket taper to permit a dry unsoftened pipe end to be inserted no more than halfway into the socket. Saddle and cross fittings are not permitted. Use male adapters for plastic to metal connections. Hand Tighten male adapters plus one turn with a strap wrench.
 4. Use solvent weld pipe for mainline pipe with a nominal diameter less than or equal to 3-inches or where a pipe connection occurs in a sleeve. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standard D2466 and D1784. Use primer approved by the pipe manufacturer. Solvent cement to conform to ASTM Standard D2564.
 5. Use flexible non-toxic polyethylene (PE) pipe. Use SDR-11.5, PE23, rated at PSI that is National Sanitation Foundation (NSF) approved, conforming to ASTM Standard D2239. Use Type 1, PVC insert fitting conforming to ASTM Standard D2609 designed for use with flexible polyethylene (PE) pipe. Use stainless steel worm gear clamps (including stainless steel screw) to join pipe and fittings. Double clamp all fittings.
 6. Provide pipe homogeneous throughout and free from visible cracks, holes, foreign materials, blisters wrinkles and dents.
 7. Provide pipe continuously and permanently marked with manufacturer's name or trademark, size schedule and type of pipe working pressure at 73 degrees F. and (NSF) approval
 8. Pipe sizes referenced in the construction documents are minimum sizes, and may be increased at the option of the "Contractor".
 9. All pipes damaged or rejected because of defects shall be removed from the site at the time of said rejection.
- B. Lateral Pipe and Fitting
1. All sprinkler laterals pipe downstream from the zone valves, sized 2" and smaller shall be flexible non-toxic polyethylene (PE) pipe. Use SDR-11.5, PE23, rated at PSI that is National Sanitation Foundation (NSF) approved, conforming to ASTM Standard D2239. Use Type 1, PVC insert fitting conforming to ASTM Standard D2609 designed for use with flexible polyethylene (PE) pipe. Use stainless steel worm gear clamps (including stainless steel screw) to join pipe and fittings.
 2. Use Class 160, SDR-26, rated at 160 PSI, conforming to the dimensions and tolerances established by ASTM Standard D2241. Use solvent weld pipe for lateral pipe. Use Schedule 40, Type 1, PVC solvent weld fittings conforming to ASTM Standards D2466 and D1784 for PVC pipe. Use primer approved by the pipe manufacturer and purple in color. Solvent cement to conform to ASTM Standard

- D2564, of a type approved by the pipe manufacturer appropriate to weather conditions.
3. For drip irrigation laterals downstream of zone control valves, use UV radiation resistant polyethylene pipe manufactured from prime Union Carbide or a Union Carbide licensee with a minimum of 2% carbon black. Use PVC/compression line fittings compatible with the drip lateral pipe. Use tubing stakes or landscape fabric staples to hold aboveground pipe in place.
- C. Specialized Pipe and Fittings:
1. All above grade pipe shall be copper pipe: Use Type “M” rigid conforming to ASTM Standard B88. Use wrought copper or cast bronze fitting, soldered or threaded per the installation details. Use 95% tin and 5% antimony solder.
 2. Galvanized steel pipe: Use Schedule 40 conforming to ASTM Standard A120. Use galvanized, threaded, standard weight malleable iron fittings.
 3. Ductile iron pipe: Use Class 50 conforming to ANSI A21.51. Use a minimum of Class 53 thickness pipe for flanged piping. Use mechanical joints conforming to ANSI A21.10 and ANSI A21.11 (AWWA C111) or flanged fittings conforming to ANSI/AWWA C110 and ANSI B16.1 (125#).
 4. Use a dielectric union wherever a copper-based metal (copper, brass, and bronze) is joined to an iron-based metal (iron, galvanized steel, and stainless steel).
 5. Low-Density Polyethylene Hose:
 - a. Use pipe specifically intended for use as a flexible swing joint.
Inside diameter: 0.490 ± 0.010 inch.
Wall thickness: 0.100 ± 0.010 inch.
Color: Black
 - b. Use spiral barb fittings supplied by the same manufacturer as the hose.
 7. Assemblies calling for threaded pipe connections shall use PVC Schedule 80 nipples and PVC Schedule 40 threaded fittings.
 8. Joint sealant: Use only Teflon-type tape or Teflon-based paste pipe joint sealant on plastic threads. Use non-hardening, nontoxic pipe joint sealant formulated for use on water-carrying pipes on metal threaded connections.
- D. Thrust Blocks:
1. Use thrust blocks for fitting on pipe greater than or equal to 3-inch diameter or any diameter rubber gasket pipe.
 2. Use 3,000-PSI concrete.
 3. Use 2-mil plastic.
 4. Use No. 4 re-bars wrapped or painted with asphalt tar based mastic coating.

2.05 MAINLINE COMPONENTS

- A. Main System Shutoff Valve: per local practice and in compliance with local code.
- B. Winterization Assembly: per local practice and in compliance with the local code.
- C. Backflow Prevention Assembly: as presented in the installation details.
- D. Isolation Gate Valve Assembly: as presented in the installation details. Install a separate valve box over a 3-inch depth of $\frac{3}{4}$ -inch gravel for each assembly.

- E. Quick Coupling Valve Assembly: double swing joint arrangements as presented in the installation details.

2.06 SPRINKLER AND BUBBLER IRRIGATION COMPONENTS

- A. Remote Control Valve (RCV) Assembly for Sprinkler and Bubbler Laterals: as presented in the installation details. Use 3M DBY wire connectors to join control wires to solenoid valves. Install a separate valve box over a 3" depth of $\frac{3}{4}$ " gravel for each assembly.
- B. Sprinkler Assembly: as presented in the drawings and installation details. When required use the sprinkler manufacturer's pressure compensating screens (ex. Rain Bird PCS) to achieve 30 PSI operating conditions on each sprinkler and to control excessive operating pressures.
- C. Bubbler Assembly: as presented in the drawings and installation details.

2.07 CONTROL SYSTEM COMPONENTS

- A. Irrigation Controller Unit:
 - 1. As presented in the drawing and installation details.
 - 2. Lighting protection: Provide 8-foot copper-clad grounding rod at controller location (when specified).
 - 3. Wire markers: Pre-numbered or labeled with indelible non-fading ink, made of permanent, non-fading material.
- B. Control Wire:
 - 1. Use Hunter ID Wire two wire communication cable, Type UF or PE cable, or 14 AWG Single Strand UL approved for direct underground burial cable from the controller unit to each remote valve (when specified).
 - 2. Color: Use white for common ground wire. Use red colors for control wires. Wire color shall be continuous over its entire length.
 - 3. Splices: Use 3M DBY-R-6 wire connector with waterproof sealant. Wire connector to be of plastic construction.
- C. Instrumentation:
 - 1. As presented in the drawing and installation details.
 - 2. When required provide, install and test an anemometer for irrigation shutdowns at user-present wind velocity thresholds, soil moisture monitoring to override irrigation in the event of high soil moisture levels, and a temperature sensor to prevent irrigation when temperatures drop below a user-preset threshold.
 - 3. Provide a rain sensor to prevent irrigation during or immediately after rainfall events
- D. Power Wire (when Specified):
 - 1. Electric wire from the power source to satellite control unit shall be solid or stranded copper, Type UF single-conductor cable, UL approved for direct underground burial. Power wires shall be black, white, and green in color. Size as presented in the drawings. The "Contractor" is responsible for verifying that the power wire sizes shown on the drawings are compatible and adequate for the control system being used.
 - 2. Splices: Use 3M DBY-R connectors.
 - 3. Conduit: PVC Schedule 40.

2.08 OTHER COMPONENTS

- A. Tools and Spare Parts: Provide operating keys, servicing tools, test equipment, spare parts, and other items indicated in the general notes of the drawings.
- B. Other Materials: Provide imported fill material as required to complete this work. Provide other materials or equipment shown on the drawings or installation details, which are part of the irrigation system, although such items may not have been referenced in these specifications.

PART 3 – EXECUTION

3.01 INSPECTION AND REVIEWS

- A. Site Inspections:
 - 1. The bidder acknowledges that he has examined the site, plans and specifications, and the submission of a proposal shall be considered evidence that examination has been made.
 - 2. Verify construction site conditions and note irregularities affecting work of this section. It shall be the contracting installer's responsibility to report to the Owner's authorized representative any deviations between drawings, specifications and the site. Failure to do so before the installing of equipment and resulting in replacing and/or relocation of equipment shall be done at the "Contractor's" expense.
 - 3. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.
 - 4. Beginning work of this section implies acceptance of existing conditions.
- B. Utility Locations:
 - 1. The exact location of all existing utilities and structures and underground utilities are not indicated on the drawings; their locations shall be determined by the "Contractor", and he shall conduct his work so as to prevent interruption of service or damage to them.
 - 2. Arrange for and coordinate with local authorities the location of all underground utilities.
 - 3. Repair any underground utilities damaged during construction. Make repairs at no additional cost above the contract price.
 - 4. The "Contractor" shall protect existing structures and utility services and be responsible for their replacement if damaged by him.
 - 5. The "Contractor" shall be responsible to verify onsite water pressure when applicable prior to construction. The "Contractor" is responsible to remedy any water pressure discrepancy discovered at their expense if the discrepancy is not reported prior to construction.
- C. Irrigation System Layout Review:
 - 1. Irrigation system layout review will occur after the staking has been completed unless specifically waived by the Landscape Architect. Notify the engineer/landscape architect/ owner's representative one-week in advance of review.
 - 2. The engineer/landscape architect/owner's representative at this review will identify modifications.

3.02 LAYOUT OF WORK

- A. Stake out the irrigation system. Items staked include: sprinklers, pipe, control valves, manual drains, quick coupling valves, backflow preventer, controller, and isolation valves.
- B. Install all mainline pipe and mainline components inside of project property lines.
- C. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to the Landscape Architect.

3.03 EXCAVATION, TRENCHING, AND BACKFILLING

- A. Excavating shall be considered unclassified and shall include all materials encountered, except materials that cannot be excavated by normal mechanical means.
- B. Excavate to permit the pipes to be laid at the intended elevations and to permit work space for installing connections and fittings.
- C. Minimum cover (distance from top of pipe or control wire to finish grade):
 - 1. 14-inch over mainline pipe and over electrical conduit.
 - 2. 6-inch over control wire.
 - 3. 10-inch over lateral pipe to sprinklers and bubblers and over manifold pipe to drip system zone control valves.
 - 4. 8-inch over drip in turf or paved areas downstream of drip system zone control valves.
 - 5. 3-inch minimum mulch cover over drip lateral pipe in planting beds downstream of drip system zone control valves.
 - 6. PVC UV radiation-resistant lateral pipe shall be installed directly on the soil surface.
- D. PVC or PE lateral pipes may be pulled into the soil using a vibratory plow device specifically manufactured for pipe pulling. Minimum burial depths equals minimum cover listed above provided soil moisture content and other conditions are suitable to allow for full depth of bury with a minimum of stretching and scraping of the pipe. Landscape Architect reserves the right to determine suitability or conditions.
- E. Backfill only after lines have been reviewed and tested.
- F. Excavated material is generally satisfactory for backfill. Backfill shall be free from rubbish, vegetable matter, and stones larger than 2 inches in maximum dimension. Remove material not suitable for backfill. Backfill placed next to pipe shall be free of sharp objects, which may damage the pipe.
- F. Backfill unsleeved pipe by depositing the backfill material equally on both sides of the pipe in 6-inch layers and compacting each layer to 90% Modified Proctor Density, ASTM D1557. Use of water for compaction, "puddling," will not be permitted.
- G. Enclose pipe and wiring beneath roadways, walks, curbs, etc., in sleeves. Minimum compaction of backfill for sleeves shall be 95% Modified Proctor Density, ASTM D1557. Use of water for compaction around sleeve, "puddling," will not be permitted.

- H. Dress backfilled areas to original grade. Incorporate excess backfill into existing site grades.
- I. Where utilities conflict with irrigation trenching and pipe work, contact the engineer/landscape architect/owner's representative for trench depth adjustments.
- J. Provide approved fine grained earth fill or sand to point 4" above the top of pipe, where soil conditions are rocky or otherwise objectionable.
- K. Excavate trenches and install piping and backfill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

3.04 SLEEVING AND BORING

- A. Install sleeving at a depth that permits the encased pipe or wiring to remain at the specified burial depth.
- B. Extend sleeve ends six inches beyond the edge of the paved surface. Cover pipe ends and mark with stakes. Mark concrete with a chiseled "X" at sleeve end and locations.
- C. Bore for sleeves under obstructions that cannot be removed. Employ equipment and methods designed for horizontal boring.

3.05 ASSEMBLING PIPE AND FITTING

- A. General:
 - 1. Keep pipe free from dirt and pipe scale. Cut pipe ends square and debur. Clean pipe ends.
 - 2. Keep ends of assembled pipe capped. Remove caps only when necessary to continue assembly.
 - 3. All mainline and continuously pressurized pipe is to be installed using open trenches. Lateral pipe may be installed by "Plowing" if soil conditions permit, and soils do not contain gravel, rock, construction debris, or other potential damaging material.
 - 4. Trenches may be curved to change direction or avoid obstructions within the limits of the curvature of the pipe. Minimum radii of curvature are 25 feet for 2-inch diameter pipe and 100 feet for 2 ½, 3, and 4-inch diameter pipe. All curvature results from the bending of the pipe lengths. No deflection will be allowed at a pipe joint.
- B. Mainline and Fittings:
 - 1. Use only strap-type friction wrenches for threaded plastic pipe.
 - 2. PVC Rubber-Gasketed Pipe:
 - a. Use pipe lubricant. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
 - b. Epoxy-coated steel fittings shall not be struck with a metallic tool. Cushion blows with a wood block or similar shock absorber.
 - 3. PVC Solvent Weld Pipe:
 - a. Use a primer and solvent cement. Join pipe in a manner recommended by the manufacturer and in accordance with accepted industry practices.
 - b. Cure for 30 minutes before handling and 24 hours before allowing water in pipe.
 - c. Snake pipe from side to side within the trench.

4. Fittings: the uses of cross type fittings or saddle-tees are not permitted.
 5. Install thrust blocks on the mainline pipe work in accordance with pipe manufacturer's written instructions.
- C. Lateral Pipe and Fittings:
1. Use only strap-type friction wrenches for threaded plastic pipe.
 2. PVC Solvent Weld Pipe:
 - a. Use primer and solvent cement. Join pipe in the manner recommended by the manufacturer and in accordance with accepted industry practices.
 - b. Cure for 30 minutes before handling and 24 hours before allowing water in the pipe.
 - c. Snake pipe from side to side within the trench:
 3. Polyethylene (PE) Pipe:
 - a. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
 - b. Snake pipe from side to side within the trench.
 - c. Double clamp pipe 1-1/2" diameter and larger.
 4. UV Radiation-Resistant Polyethylene Pipe:
 - a. Join pipe in the manner recommended by the manufacturer and in accordance with accepted industry practices.
 - b. Snake pipe side to side within the trench, on the soil surface, and hold in place with the tubing stakes or landscape fabric staples spaced every five feet. Pipe is not to be compressed or crimped by the stake or staple or other construction activity.
 5. The use of cross types fittings and /or saddle tees are not permitted.
- D. Specialized Pipe and Fitting:
1. Copper Pipe:
 - a. Buff surface to be joined to a bright finish. Coat with solder flux.
 - b. Solder so that a continuous bead shows around the joint circumference.
 2. Galvanized Steel Pipe:
 - a. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
 - b. Use factory-made threads whenever possible. Field-cut threads will be permitted only where necessary. Cut threads on axis using clean, sharp dies.
 - c. Apply Teflon-type tape or pipe joint compound to the male threads only.
 3. Ductile Iron Pipe:
 - a. Join pipe in the manner recommended by manufacturer and in accordance with accepted industry practices.
 - b. Insert dielectric union wherever a copper-based metal (copper, brass, bronze) and an iron-based metal (iron, galvanized steel, and stainless steel) are joined.
 4. Low-Density Polyethylene Hose: Install per manufacturer's recommendations.
 5. PVC Threaded Connections:
 - a. Use only factory-formed threads. Field-cut threads are not permitted.
 - b. Use only Teflon-type tape or Teflon-based paste.
 6. Threaded Connections:
 - a. When connection is plastic to metal, the plastic component shall have male threads and the metal component shall have female threads.
 - b. Make metal-to-metal, threaded connections with Teflon-type tape or pipe joint compound applied to the male threads only.

- E. Thrust Blocks:
 - 1. Use cast-in-place concrete bearing against undisturbed soil.
 - 2. Size, orientation, and placement shall be as shown on the installation details.
 - 3. Wrap fitting with plastic to protect bolts, joint, and fitting from concrete.
 - 4. Install re-bar with mastic coating as shown on the installation details.

3.06 INSTALLATION OF MAINLINE COMPONENTS

- A. Main System Shut Off Valve: Install where indicated on the drawing.
- B. Winterization Assembly: Install where indicated on the drawing.
- C. Backflow Prevention Assembly: Install where indicated on the drawing. Install assembly so that its elevation, orientation, access, and drainage conform to the manufacturer's recommendations and all applicable health codes.
- D. Quick Coupling Valve Assembly: Install where indicated on the drawings.
- E. Manual Drain Valve Assembly: Install where indicated on the drawings and at other low points in the mainline piping.

3.07 INSTALLATION OF SPRINKLER AND IRRIGATION COMPONENTS:

- A. Remote Control Valve (RCV) Assembly for Sprinkler and Bubbler Laterals:
 - 1. Flush mainline before installation of RCV assembly.
 - 2. Install where indicated on the drawing. Wire connectors and waterproof sealant shall be used to connect control wires to remote control valve wire. Install connectors and sealant per the manufacturer's recommendations.
 - 3. Install only one RCV to a valve box. Locate valve box at least 12 inches from and align with nearby walls and edges of paved areas. Group RCV assemblies together where practical. Arrange grouped valve boxes in rectangular patterns. Allow at least 12 inches between valve boxes.
 - 4. Adjust RCV to regulate the downstream operating pressure.
 - 5. Attach ID tag with controller station number to control wiring.
- B. Sprinkler Assembly:
 - 1. Flush lateral pipe before installing sprinkler assembly.
 - 2. Install per the installation details at locations shown on the drawings.
 - 3. Locate rotor sprinklers 6 inches from adjacent walls, fences, or edges of paved areas.
 - 4. Locate spray sprinklers 3 inches from adjacent walls, fences, or edges of paved areas.
 - 5. Install sprinklers perpendicular to the finish grade.
 - 6. Supply appropriate nozzle or adjust arc of coverage of each sprinkler for best performance.
 - 7. Adjust the radius of throw of each sprinkler for best performance.
- C. Bubbler Assembly:
 - 1. Flush lateral pipe before installing bubbler assembly.
 - 2. Install bubbler assembly per the installation details at locations shown on the drawings.

3. Adjust the output flow of each bubbler for performance.

3.08 INSTALLATION OF CONTROL SYSTEM COMPONENTS:

A. Irrigation Controller Unit:

1. The location of the collector unit as depicted on the drawings is approximate; the engineer/landscape architect/owner's representative will determine the exact site location during sprinkler layout review.
2. Lighting protection: Drive 8-foot copper-clad grounding rod into the soil. If rock prevents driving, bury at least four feet deep. Use one rod for each controller. Connect controller to ground rod with AWG No. 10 solid conductor copper wire. Secure wire to grounding rod with brass or bronze clamp. Locate the connection in a separate valve box (when specified).
3. Attach wire markers to the ends of control wires inside the controller unit housing. Label wires with the identification numbers (see drawings) of the remote control valve to which the control wire is connected..
4. Connect control wires to the corresponding controller terminal.

B. Control Wire:

1. Bundle control wires where two or more are in the same trench. Bundle with pipe wrapping tape at 10-foot intervals.
2. Control wiring may be chiseled into the soil using a vibratory plow device specifically manufactured for pie pulling and wire installation. Appropriate chisel must be used so that wire is fed into a chute on the chisel, and wire is not subject to pulling tension. Minimum burial depth must equal minimum cover previously listed.
3. Provide a 24-inch excess length of wire in an 8-inch diameter loop at each 90-degree change of direction, at both ends of sleeves and at 100-foot intervals along continuous runs of wiring. Do not tie wiring loop. Coil 24-inch length of wire within each remote control valve box.
4. Install common ground wire for each remote control valve decoder.
5. If a control wire must be spliced, make splice with wire connectors and waterproof sealant, installed per the manufacturer's instructions. Locate splice in a valve box that contains an irrigation valve assembly, or in a separate 6-inch round valve box.
6. Use same procedure for connection to valves as for in-line splices.
7. Unless noted on plans, install wire parallel with and below PVC mainline pipe.
8. Protect wire not installed with PVC mainline pipe with a continuous run of warning tape placed in the backfill six inches above the wiring.

C. Instrumentation:

1. Install sensor per the installation details and manufacturer's recommendations. Install at locations shown on the drawings.
2. Install electrical connections between central control unit components and sensors per manufacturer's recommendations.

D. Power Wire (when specified):

1. Route power wire as directed on plans. Install with a minimum number of field splices. If a power wire must be spliced, make splice with recommended connector, installed per manufacturer's recommendations. Locate all splices in a separate 10-inch round valve box. Coil 2 feet of wire in valve box.
2. All power wire shall be laid in a trench. The use of a vibratory plow is not permitted.

3. Green wire shall be used as the common ground wire from power source to all satellites.
4. Carefully backfill around power wire to avoid damage to wire insulation or wire connectors.
5. Unless noted on plans, install wire parallel with and below mainline pipe. Install wire 2 inches below top of PVC mainline pipe.
6. Encase wire not installed with PVC mainline pipe in electrical conduit with a continuous run of warning tape placed in the backfill, 6 inches above wiring.

3.09 INSTALLATION OF OTHER COMPONENTS:

- A. Tools and Spare Parts: Prior to the review at completion of construction, supply to the owner operating keys, servicing tools, spare parts, test equipment, and any other items indicated in general notes on the drawings. Provide at least (2) quick coupling keys and hose adapters.
- B. Other Materials: Install other materials or equipment shown on the drawings or installation details which are part of the irrigation system, even though such items may not have been referenced in these specifications.

3.10 MAINTENANCE:

- A. Upon completion of construction and review by the engineer/landscape architect/owner's representative, maintain irrigation system for duration of 30 calendar days. Make periodic examinations and adjustments to irrigation system components to achieve the most desirable application of water.
- B. Following completion of the "Contractor's" maintenance period, the owner will be responsible for maintaining the system in working order during the remainder of the guarantee /warranty period, for performing necessary minor maintenance, for trimming around sprinklers, for protecting against vandalism, and for preventing damage after the landscape maintenance operation.

3.11 ACCEPTANCE

- A. Instruct the Owner's designated personnel in the operation of the system, including adjustment of sprinklers, controller(s), valves, pump controls, and moisture sensing controls.

3.12 CLEANING

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soils, debris, and equipment. Repair damage resulting from sprinkler system installation.

END OF SECTION 32 8423

SECTION 32 9219 – SEEDING (Alternate 1)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of seeded lawns is shown on drawings and by provision of this Section.

- B. Types of work required includes the following:

1. Soil preparation
2. Seeding lawns
3. Mulching
4. Hydroseeding lawns (Contractor's option)

- C. Related Work Specified Elsewhere:

1. Section 31 2216: Fine Grading
2. Section 32 0190: Operation and Maintenance of Planting
3. Section 32 0515: Soils for Exterior Improvements
4. Section 32 8423: Underground Sprinklers
5. Section 32 9223: Sodding (Base Bid)

1.03 SUBMITTALS:

- A. Submit seed vendor's certification for required grass seed mixture, indicating percentage by weight and percentages of purity, germination and weed seed for each grass species.

1.04 DELIVERY, STORAGE AND HANDLING:

- A. Deliver seed and fertilizer materials in original unopened containers, showing weight, analysis and name of manufacturer. Store in a manner to prevent wetting and deterioration.

1.05 PROJECT CONDITIONS:

- A. Work notification: Notify Landscape Architect at least 7 working days prior to start of seeding operation.
- B. Protect existing utilities, paving and other facilities from damage caused by seeding operations.
- C. Perform seeding work only after planting and other work affecting ground surface has been completed.
- D. Provide hose and lawn watering equipment as required.

- E. The irrigation system will be installed prior to seeding. Locate, protect and maintain the irrigation system during seeding operations. Repair irrigation system components damaged during seeding operations at this Contractor's expense.

1.06 WARRANTY:

- A. Refer to Section 32 0190.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Topsoil for Seeding Lawn Areas: Refer to Section 32 0515 and to drawings.
- B. Seed: Fresh, clean and new crop seed mixture. Mixed by approved methods.
- C. Composed of the following varieties, mixed to the specified proportions by weight and tested to minimum percentages of purity and germination.
- D. Seed Mixture: Proportioned by weight as indicated below:

Irrigated Lawn Areas

	Minimum Proportion	Minimum Purity	Germination
Merit Kentucky Bluegrass	25%	95%	80%
Baron Kentucky Bluegrass	25%	95%	80%
Manhattan II Turf Type Rye	50%	95%	80%

Spread at a rate of 7 lbs./1000 sf

No noxious weed seeds permitted.

- E. Fertilizer: Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
 - 1. Type A: Starter fertilizer 6-24-24 by weight or similar approved composition.
- F. Ground limestone: Used if required by soil test report. Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20% mesh sieve.
- G. Granulated sulfur 0-0-0-90 to lower PH. Use if determined by soil tests to be necessary. Apply per soil test recommendations at specified rate.
- H. Straw mulch: Used in crimping process only. Clean oat or wheat straw well seasoned before bailing, free from mature seed-bearing stalks or roots of prohibited or noxious weeds.
- I. Water: Free of substance harmful to seed growth. Hoses or other methods of transportation furnished by Contractor. Test for excess Alkalinity, if necessary.
- J. Wood Cellulose Fiber Mulch: Degradable green dyed wood cellulose fiber or 100% recycled long fiber pulp, free from weeds or other foreign matter toxic to seed germination and suitable to hydromulching.

AVAILABLE MANUFACTURER AND TYPE:

CONWED HYDROMULCH: CONWED CORP., ST. PAUL MN

- K. Paper Mulch: Degradable paper mulch, free of foreign debris. Do not use on slopes over 30%. Available manufacturer and type NU Wool Hydro Mulch, Jennison, MI.
- L. Tackifier: Liquid concentrate diluted with water forming a transparent 3-dimensional film like crust permeable to water and air and containing not agents toxic to seed germination.

AVAILABLE MANUFACTURER AND TYPE:

FINN HYDROSTIK, FAIRFIELD, OH

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Landscape architect must approve finish surfaces, grades, topsoil quality and depth. Do not start seeding work until unsatisfactory conditions are corrected.

3.02 PREPARATION OF SEEDED LAWN AREAS:

- A. Limit preparation to areas which will be immediately seeded.
- B. Treat lawn areas if required with "Round Up", by Monsanto, per label directions to kill existing vegetation prior to seeding.
- C. Loosen topsoil of lawn areas to minimum depth of 4". Remove stones over 1" in any dimension and sticks, roots, rubbish and extraneous matter.
- D. Grade lawn areas to a smooth, free draining even surface with a loose, moderately coarse texture. Roll and rake, remove ridges and fill depressions as required to drain.
- E. Apply amendments to supplied or existing topsoil, if required by soil test report, at rate determined by the soil test, to adjust pH of topsoil. Distribute evenly by machine and incorporate thoroughly into topsoil.
- F. Apply fertilizer to indicated turf areas at a rate equal to 1 lb. of actual nitrogen per 1,000 sq. ft. (43 lbs/acre). Omit this process if applied with hydroseeding process.
- G. Apply fertilizers by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with soil to a depth of 1" by discing or other approved method. Fertilize areas inaccessible to power equipment with hand tools and incorporate into soil.
- H. Restore prepared areas to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to seeding.

3.03 INSTALLATION:

- A. Seed lawns only between April 1 and June 1 and fall seeding between August 15 and October 15 or at such other times acceptable to Landscape Architect.

- B. Seed immediately after preparation of bed. Seed indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.
- C. Perform seeding operations when the soil is dry and when winds do not exceed 5 miles per hour velocity.
- D. Apply seed with a rotary or drop type distributor. Install seed evenly by sowing equal quantities in directions, at right angles to each other.
- E. Sow seed at a rate of 7 lbs/1000 sf. (300 lbs/acres).
- F. After seeding, rake or drag surface of soil lightly to incorporate seed into top 1/8" of soil. Roll with light lawn roller.

3.04 MULCHING:

- A. Place straw mulch on seeded areas within 24 hours after seeding.
- B. Place straw mulch uniformly in a continuous blanket at a rate of 2-1/2 tons per acre or (2) 50 lb. bales per 1,000 sq. ft. of area. A mechanical blower may be used for straw mulch application when acceptable to the Architect.
- C. Crimp straw into soil by use of a "crimper". Two passes in opposite direction required.

3.05 HYDROSEEDING: (Optional Method)

- A. Use a hydromulcher (sprayer) and apply mixture(s) at the following rate. Mix in accordance with manufacturer's recommendations.
- B. Apply hydroseed slurry to indicated areas. Use tackifier only on erosion prone areas. Apply fertilizer with hydro mix.

Seed: 300 pounds per acre
Fertilizer: 400 pounds per acre
Tackifier: 60 gallons per acre
Wood Cellulose Fiber Mulch: 2000 pounds per acre

- C. Care must be taken not to get hydroseed materials on buildings, walks, roadways, plant beds etc.

3.06 LAWN ESTABLISHMENT:

- A. Establish dense lawn of permanent grasses, free from lumps and depressions. Any area failing to show uniform germination to be reseeded; continue until dense lawn established. Damage to seeded area resulting from erosion to be repaired by Contractor. Scattered bare spots over 5 percent not allowed.
- B. In event contractor does not establish dense lawn during germination period, return to project to refertilize and reseed to establish dense lawn.
- C. Should the seeded lawn become largely weeds after germination, Contractor responsible to kill the weeds and reseed the proposed lawn areas to produce a dense turf, as specified.

3.07 CLEANING:

- A. Perform cleaning during installation of the work and upon completion of the work to the approval of the Landscape Architect. Remove from site all excess materials, debris and equipment. Repair damage resulting from seeding operations. Clean all areas where overspray has occurred from hydroseeding operations.

END OF SECTION 32 9219

SECTION 32 9223 – SODDING (Base Bid)

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions, hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of sodded lawns is shown on drawings and by provisions of this Section.

- B. Types of work required include the following:

- 1. Soil preparation
- 2. Sodding lawns

- C. Related work specified elsewhere:

- 1. Section 31 2216: Fine Grading
- 2. Section 32 0190: Operation and Maintenance of Planting
- 3. Section 32 0515: Soils for Exterior Improvements
- 4. Section 32 9219: Seeding (Alternate 1)
- 5. Section 32 8423: Underground Sprinklers
- 5. Section 32 9300: Plants, Preparation & Accessories

1.03 QUALITY ASSURANCE:

- A. Sod: Comply with American Sod Producers Association (ASPA) classes of sod materials.

1.04 SUBMITTALS:

- A. Submit sod growers certification of grass species including special shade grown species. Identify source location.
- B. Manufacturer's certification of fertilizer.

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Cut, deliver and install sod within 24 hour period.
- B. Do not harvest or transport sod when moisture content may adversely affect sod survival.
- C. Protect sod from sun, wind and dehydration prior to installation. Do not tear, stretch or drop sod during handling and installation.

1.06 PROJECT CONDITIONS:

- A. Work notifications: Notify Landscape Architect at least 7 working days prior to start of sodding operation.
- B. Protect existing utilities, paving and other facilities from damage caused by sodding operations.

- C. Perform sodding work only after planting and other work affecting ground surface has been completed.
- D. Restrict traffic from lawn areas until grass is established. Erect signs and barriers as required.
- E. Provide hose and lawn watering equipment as required.
- F. An irrigation system will be installed prior to sodding. Locate, protect and maintain the irrigation system during sodding operations. Repair irrigation system components damaged during sodding operations at this Contractor's expense.

1.07 WARRANTY:

- A. Refer to Section 32 0190

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Sod: An "approved" nursery grown blend of improved Kentucky Blue-grass varieties.
 - 1. Sod containing Common Bermudagrass, Quackgrass, Johnsongrass, Poison Ivy, Nutsedge, Nimblewill, Canada Thistle, Timothy, Bentgrass, Wild Garlic, Ground Ivy, Perennial Sorrel or Brome grass weeds will not be acceptable.
- B. Provide well-rooted, healthy sod, free of diseases, nematodes and soil borne insects. Provide sod uniform in color, leaf texture, density and free of weeds, undesirable grasses, stones, roots, thatch and extraneous material; viable and capable of growth and development when planted.
- C. Furnish sod machine stripped in square pads or strips not more than 3'-0" long; uniformly 1" to 1-1/2" thick with clean cut edges. Mow sod before stripping.
- D. Fertilizer: Granular, non-burning product composed of not less than 50% organic slow acting, guaranteed analysis professional fertilizer.
 - 1. Type A: Starter fertilizer containing 20% nitrogen, 12% phosphoric acid and 8% potash by weight or similar approved composition.
- E. Ground limestone: Containing not less than 85% of total carbonates and ground to such fineness that 50% will pass through a 100 mesh sieve and 90% will pass through a 20 mesh sieve. Use if determined by soil tests to be necessary.
- F. Stakes: Softwood, 3/4" x 8" long.
- G. Water: Free of substance harmful to sod growth. Hoses or other methods of transportation furnished by Contractor.
- H. Topsoil: Refer to Section 32 0515

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine finish surfaces, grades, topsoil quality and depth. Do not start sodding work until unsatisfactory conditions are corrected.

3.02 PREPARATION:

- A. Limit preparation to areas which will be immediately sodded. Spread topsoil, fine grade.
- B. Treat lawn areas with "Round Up", by Monsanto, per label directions as required to kill existing vegetation prior to sodding.
- C. Loosen topsoil of lawn areas to minimum depth of 3". Remove stones over 1" in any dimension and sticks, roots, rubbish and extraneous matter.
- D. Grade lawn areas to smooth, free draining and even surface with a loose, uniformly fine texture. Roll and rake; remove ridges and fill depressions as required to drain.
- E. Apply type A fertilizer at the rate equal to 1.0 lb. of actual nitrogen per 1,000 sq. ft. (43 lbs./acre). Apply fertilizer by mechanical rotary or drop type distributor, thoroughly and evenly incorporated with the soil to depth of 1" by discing or other approved methods. Fertilize areas inaccessible to power equipment with hand tools and incorporated it into soil.
- F. Dampen dry soil prior to sodding.
- G. Restore prepared area to specified condition if eroded, settled or otherwise disturbed after fine grading and prior to sodding.

3.03 INSTALLATION:

- A. Lay sod to form a solid mass with tightly-fitted joints. Butt ends and sides of sod strips. Do not overlay edges. Stagger strips to offset joints in adjacent course. Remove excess sod to avoid smothering of adjacent grass. Provide sod pad top flush with adjacent curbs, sidewalks, drains and landscaped areas.
- B. Do not lay dormant sod or install sod on saturated or frozen soil.
- C. Install initial row of sod in a straight line, beginning at bottom of slopes, perpendicular to direction of the sloped area. Place subsequent rows parallel to and lightly against previously installed row.
- D. Peg sod on slopes greater than 3 to 1 to prevent slippage at a rate of 2 stakes per yd. of sod.
- E. Water sod thoroughly with a fine spray immediately after laying.
- F. Roll with light lawn roller to ensure contact with sub-grade.
- G. Sod indicated areas within contract limits and areas adjoining contract limits disturbed as a result of construction operations.

3.04 MAINTENANCE:

A. Refer to Section 32 0190

3.05 ACCEPTANCE:

A. Refer to Section 32 0190

3.06 CLEANING:

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, debris and equipment. Repair damage resulting from sodding operations.

END OF SECTION 32 9223

SECTION 32 93 00 - PLANTS, PREPARATION & ACCESSORIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. Attention is directed to Bidding and Contract Requirements, and to General and Supplemental Conditions hereby made a part of this Section.

1.02 DESCRIPTION OF WORK:

- A. Extent of trees, shrubs and ground covers is shown on drawing and by provisions of this Section.
- B. Types of work required include the following:
 - 1. Soil preparation
 - 2. Trees, shrubs, and ground covers
 - 3. Planting mixes
 - 4. Mulch and planting accessories
 - 5. Soil percolation tests
- C. Related work specified elsewhere:
 - 1. Section 31 2200: Grading
 - 2. Section 31 2216: Fine Grading
 - 3. Section 32 0190: Operation & Maintenance of Plantings
 - 4. Section 32 0515: Soils for Exterior Improvements
 - 5. Section 32 8423: Underground Sprinklers
 - 6. Section 32 9219: Seeding (Alternate 1)
 - 7. Section 32 9223: Sodding (Base Bid)

1.03 QUALITY ASSURANCE:

- A. Plant names indicated, comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.
- B. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.
- C. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.
- D. Stock furnished shall be at least the minimum size indicated. Larger stock is acceptable, at no additional charge. Larger plants shall not be cut back to size indicated.
- E. Provide "specimen" plants with a special height, shape or character of growth. Landscape Contractor to tag specimen trees or shrubs at the source of supply. The Landscape Architect will inspect specimen selections at the source of supply for suitability and adaptability to selected location. When specimen plants cannot be purchased locally, provide sufficient photographs of the proposed specimen plants for approval. The Landscape Contractor shall

inspect all plant material at source prior to Landscape Architect's approval. Landscape Contractor shall accompany Landscape Architect on final selection trip.

- F. Such approval shall not impair the right of inspection and rejection upon delivery at the site or during the progress of the work.
- G. Provide percolation testing by filling plant pits with water and monitoring length of time for water to completely percolate into soil. Submit test results to landscape architect prior to starting work.

1.04 SUBMITTALS:

- A. Submit the following material samples:
 - 1. Shredded bark mulch.
- B. Submit the following materials certification:
 - 1. Topsoil source and pH value
 - 2. Plant fertilizer

1.05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver fertilizer materials in original, unopened, and undamaged containers showing weight, analysis, and name of manufacturer. Store in manner to prevent wetting and deterioration.
- B. Take all precautions customary in good trade practice in preparing plants for moving. Workmanship that fails to meet the highest standards will be rejected. Spray deciduous plants in foliage with an approved "Anti-Dessicant" immediately after digging to prevent dehydration. Dig, pack, transport, and handle plants with care to ensure protection against injury. Inspection certificates required by law shall accompany each shipment invoice or order to stock and on arrival. A copy of certificate shall be filed with the Landscape Architect. Protect all plants from drying out. If plants cannot be planted immediately upon delivery, properly protect them with soil, wet peat moss or in a manner acceptable to the Landscape Architect. Water heeled-in plantings as required to keep root system moist until planting. No plant shall be bound with rope or wire in a manner that could damage or break the branches.
- C. Cover plants transported on open vehicles with a protective covering to prevent windburn.
- D. Frozen or muddy topsoil is not acceptable.

1.06 PROJECT CONDITIONS:

- A. Work Notification: Notify Architect at least 7 working days prior to installation of plant material.
- B. Protect existing utilities, paving and other facilities from damage caused by landscaping operations. See AIA General Conditions.
- C. A complete list of plants, including a schedule of sizes, quantities and other requirements is shown on the proposal form. In the event that quantity discrepancies or material omissions occur in the proposal form, Contractor shall notify the Landscape Architect during the proposal bidding process.

- D. An irrigation system will be installed prior to planting. Locate, protect and maintain the irrigation system during planting operations. Repair irrigation system components damaged during planting operations, at this Contractor's expense.
- E. Perform percolation testing.
- F. Verify availability of on-site water.
- G. Concealed contingencies. Refer to General Conditions.

1.07 WARRANTY:

- A. Refer to Section 32 0190.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Plants: Provide plants typical of their species or variety; with normal, densely developed branches and vigorous, fibrous root systems. Provide only sound, healthy, vigorous plants free from defects, disfiguring knots, sunscald injuries, frost cracks, abrasions of the bark, plant diseases, insect eggs, borers, and all forms of infestation. All plants shall have a fully developed form without voids and open spaces.
 - 1. Dig balled and burlapped plants with firm, natural balls of earth of sufficient diameter and depth to encompass the fibrous and feeding root system necessary for full recovery of the plant. Provide ball sizes complying with the latest edition of the "American Standard for Nursery Stock". Cracked or mushroomed balls are not acceptable.
 - 2. Provide tree species that mature at heights over 25'-0" with a single, main trunk. Trees that have the main trunk forming a "Y" shape are not acceptable.
 - 3. Trees to have clay or clay loam balls; sandy loam or sand balls are not acceptable.
 - 4. Plants planted in rows shall be matched in form. (See specimen stock).
 - 5. Plants larger than those specified in the plant list may be used when acceptable to the Landscape Architect.
 - 6. If the use of larger plants is acceptable, increase the spread of roots or root ball in proportion to the size of the plant.
 - 7. The height of the trees, specified by height, measured from the crown of the roots to the top of the top branch, shall not be less than the minimum size designated in the proposal form.
 - 8. No pruning wounds shall be present with a diameter of more than 1" and such wounds must show vigorous bark on all edges.
 - 9. Evergreen trees shall be unsheared and branched to the ground.

10. Shrubs and small plants shall meet the requirements for spread and height indicated on the proposal form.
- B. Container-grown Stock: Grown in a container for sufficient length of time for the root system to have developed to hold its soil together, firm and whole.
 1. No plants shall be loose in the container.
 2. Container stock shall not be root bound.
 3. The measurements for height shall be taken from the ground level to the average height of the top of the plant and not the longest branch.
 4. Single stemmed or thin plants will not be accepted.
 5. Side branches shall be generous, well twigged and the plant as a whole well bushed to the ground.
 6. Plants shall be in a moist, vigorous condition, free from dead wood, bruises or other root or branch injuries.
- C. Specimen Stock: All specimen designated plantings are to be nursery grown, fully developed, excellent quality and typical example of the species. Plants designated to be planted in rows must be matched, symmetrical and uniform in height, spread, caliper and branching density.
 1. Matched plantings should be obtained from same nursery and, preferably, from same row or line. All specimen material will be approved by Landscape Architect at nursery.
- D. Topsoil for Planting Mix: Refer to Section 32 0515.
- E. Peat Moss: Brown to black in color, weed and seed free granulated raw peat.
 1. Provide ASTM D 2607 sphagnum peat moss with a PH below 6.0 for ericaceous plants.
- F. Compost: Shall be mature/stabilized, humus-like material derived from the aerobic decomposition of yard clippings or other compostable materials. Dark brown or black color capable of supporting plant growth without the addition of fertilizers or other soil amendments and shall not have an objectionable odor. The compost shall be free of plastic, glass, metal, and other physical contaminants, as well as viable weed seeds and other plant parts capable of reproducing (except airborne weed species). The compost shall be visually inspected and approved prior to placement. The compost mixture shall be such that no visible free water or dust is produced when handling it.
- G. Planting Mixture Type A: Standard planting backfill shall be a mixture of 1/3 topsoil, 1/3 sand and 1/3 peat per cubic yard of mixture. Add fertilizer Type "A" to planting mixture per manufacturer's requirements. Follow planting details.
- H. Planting Mixture Type B (for Flowers, Ground Cover Beds, Ericaceous Plants and Ornamental Grasses): Planting backfill shall be a mixture of 1/3 topsoil, 1/3 sand and 1/3 compost Adding fertilizer type "B" to mixture per manufacturer requirements. Follow planting details.

- I. Plant Fertilizer Type A: "Scotts Pro Grow 18-3-6 landscape fertilizer plus minors, applied per manufacturer's recommendations.
- J. Plant Fertilizer Type B: Approved acid-base fertilizer; "Espoma Holly-Tone". 4-6-4 applied per manufacturer's instructions.
- K. "MyCor" Tree Saver Soil Conditioner manufactured by Plant Health Care, Inc., 1-800-421-9051. Use for all tree and shrub species except Rhododendrons, Azaleas and Laurels.
- L. Superphosphate: Composed of finely ground phosphate rock as commonly used for agricultural purposes containing not less than eighteen (18%) percent available phosphoric acid. Apply as required based upon soil test report.
- M. Lime: Ground dolomitic limestone, ninety-five (95%) percent passing through #100 mesh screen. Use to adjust soil pH only, under direction of Landscape Architect or based upon soil test report.
- N. Sand: Clean, coarse, ungraded conforming to MDOT Class II.
- O. Anti-Dessicant: Protective film emulsion providing a protective film over plant surfaces; permeable to permit transpiration. Mixed and applied in accordance with manufacturer's instructions.
- P. Shredded Bark Mulch: Clean, free of debris and sticks, and well aerated. Materials shall be uniform in size, shape, and texture. Submit samples to owner for approval prior to installation.
- Q. Water: Free of substances harmful to plant growth. Hoses or other methods of transportation furnished by Contractor.
- R. Stakes for Staking: Hardwood, 2" x 2" x 6'-0" minimum length.
- S. High tensity synthetic fiber. 3/4" wide with minimum breaking strength of 900 pounds.
 - 1. Approved synthetic fiber manufacturers:
 - a. Arbortie by Deep Root
1.800.458.7668
info@deepproot.com
 - b. Arbortape by American Arborist Supplies
1.800.441.8381
info@arborist.com
- T. Stakes for Guying: Hardwood, 2" x 2" x 36" minimum length.
- U. Guying Wire: No. 11 gauge galvanized wire.
- V. Turnbuckles: Galvanized steel of size and gauge required to provide tensile strength equal to that of the wire. Turnbuckle opening shall be at least 3".
- W. Guying Hose: Two-ply, reinforced garden hose not less than 1/2" inside diameter.

- X. Tree Wrap: Standard waterproofed tree wrapping paper, 2-1/2" wide, made of 2 layers of crepe kraft paper weighing not less than 30 lbs. per ream, cemented together with asphalt.
- Y. Twine: Two-ply jute material.

PART 3 - EXECUTION

3.01 EXAMINATION:

- A. Examine proposed planting areas and conditions of installation. Do not start planting work until unsatisfactory conditions are corrected.

3.02 PREPARATION:

- A. Time of planting:
 - 1. Evergreen material: Plant evergreen materials between August 15 and October 1 or in spring before new growth begins. If project requirements require planting at other times, plants shall be sprayed with anti-dessicant prior to planting operations.
 - 2. Deciduous material: Plant deciduous materials in a dormant condition. If deciduous trees are planted in-leaf, they shall be sprayed with an anti-dessicant prior to planting operation.
 - 3. Planting times other than those indicated shall be acceptable to the Landscape Architect.
- B. Planting shall be performed only by experienced workmen familiar with planting procedures under the supervision of a qualified supervisor.
- C. Individual plant locations shall be staked on the project site by the Contractor and approved by the Landscape Architect before any planting pits are dug. The Landscape Architect reserves the right to adjust plant material locations to meet field conditions, without additional cost to the Owner.
- D. Planting pits shall be round, with vertical sides and flat bottoms and sized in accordance with outlines and dimensions shown on the planting details.
- E. Accurately stake plant material according to the drawings. Stakes shall be above grade and painted a bright color to be clearly visible for inspection.
- F. If obstructions are encountered that are not indicated, do not proceed with planting operations until alternative plant locations have been selected and approved in writing by the Landscape Architect. Where location or spacing dimensions are not clearly shown, request clarification by the Landscape Architect.
- G. See drawings for planting details.
- H. Vegetation Removal:
 - 1. Strip existing grass and weeds, including roots, from all bed areas, till and fine grade existing topsoil, leaving the soil surface one inch below finished grade (in areas shown on plan).

2. Herbicide: Use Round Up (Monsanto Co.) as required to prepare areas for new planting, applied to all ground cover, evergreen and shrubbery beds and all mulch areas before application of pre-emergence herbicide, per manufacturer's recommendations. Clean area of all dead material after five (5) days.
3. Pre-Emergence Herbicide: DACTHAL W-75 (Diamond Shamrock Agricultural Chemicals) applied to one (1) ounce per 100 square feet to same area where "Herbicide" has been applied and after area is cleared of dead vegetation.
4. Herbicides to be applied by licensed applicator as required by the state.

3.03 INSTALLATION:

- A. Excavate circular plant pits with vertical sides, except for plants specifically indicated to be planted in beds. Provide plant pits per planting details. Depth of pit shall accommodate the root system. Scarify the bottom of the pit to a depth of 4".
- B. Provide pre-mixed planting mixture Type "A" for use around the balls and roots of all deciduous and evergreen tree plantings.
- C. Beds for Ground Cover, Flowers, Ericaceous Plants and Ornamental Grasses: Excavate existing soil to 12" depth over entire bed area and remove soil from site. Set plants according to drawings and backfill entire bed with pre-mixed planting mixture Type "B".
- D. Mass Shrub Beds/Hedge Beds: Excavate existing soil to 18" depth over entire bed area and remove soil from site. Scarify bottom of the bed to a 4" depth. Set plants according to drawings and specs. and backfill entire bed with (pre-mixed) specified planting mixture Type "A".
- E. Planting:
 1. Set plant material in the planting pit to proper grade and alignment. Set plants upright, plumb and faced to give the best appearance or relationship to each other or adjacent structure. Set plant material 2"-3" above the finish grade. No filling will be permitted around trunks or stems. Backfill the pit with planting mixture. Do not use frozen or muddy mixtures for backfilling. Form a ring of soil around the edge of each planting pit to retain water in non-irrigated areas.
 2. After balled and burlapped plants are set, muddle planting soil mixture around bases of balls and fill all voids. Sufficiently compact to prevent settlement.
 3. Add "MyCor" Tree Saver to mix per manufacturer's directions.
 4. Remove all burlap, ropes, and wires from the tops of balls.
 5. Space ground cover plants in accordance with indicated dimensions. Adjust spacing as necessary to evenly fill planting bed with indicated quantity of plants. Plant to within 12" of the trunks of trees and shrubs within planting bed and to within 6" of edge of bed.
 6. Spread and arrange roots of bare-rooted plants in their natural position. Work-in planting mixture. Do not mat roots together. Cut all broken and frayed roots before installing planting mixture.

7. Water immediately after planting.

F. Mulching:

1. Mulch tree and shrub planting pits and shrub beds with required mulching material 3" deep immediately after planting. Thoroughly water mulched areas. After watering, rake mulch to provide a uniform finished surface.

G. Wrapping, Guying, Staking:

1. Inspect trees for injury to trunks, evidence of insect infestation and improper pruning before wrapping.
2. Wrap trunks of all trees spirally from bottom to top with specified tree wrap and secure in place.
3. Stake/guy all trees immediately after lawn seeding or sodding operations and prior to acceptance. When high winds or other conditions which may affect tree survival or appearance occur, the Architect shall require immediate staking/guying.
4. Stake deciduous trees under 4" caliper. Stake evergreen trees under 12'-0" tall with 2 x 2 cedar stakes, 2 per tree.
5. Guy deciduous trees 4" caliper and over. Guy evergreen trees 12'-0" tall and over with metal fence post, 3 per tree.

H. Pruning:

1. Prune branches of deciduous stock, after planting, to balance the loss of roots and preserve the natural character appropriate to the particular plant requirements. Remove or cut back broken, damaged and unsymmetrical growth of new wood.
2. Multiple leader plants: Preserve the leader which will best promote the symmetry of the plant. Cut branches flush with the branch collar. Make cut on an angle.
3. Prune evergreen trees only to remove broken or damaged branches.

3.04 MAINTENANCE:

- A. Refer to Section 32 0190.

3.05 CLEANING:

- A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris and equipment. Repair damage resulting from planting operations.

END OF SECTION 32 9300

SECTION 33 4616.19 - PIPE UNDERDRAINS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Attention is directed to Bidding and Contract Requirements, and General and Supplemental Requirements, which are hereby made a part of this Section.

1.02 SUMMARY

- A. Extent of Underdrainage System work is shown on drawings.
- B. Underdrainage system work includes, but not limited to, the following:
 - 1. Perforated under drains and connections
- C. Related Work Specified Elsewhere:
 - 1. Section: 31 2200: Grading
 - 2. Section: 31 2216: Fine Grading
 - 3. Section: 32 0515: Soils for Exterior Improvements
 - 4. Section 32 3223: Segmental Retaining Walls

1.03 QUALITY ASSURANCE

- A. Installers' Qualifications: Firm with at least 3 years of successful installation experience on projects with underdrainage system work similar to that required for project.
- B. Codes and Standards:
 - 1. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of underdrainage system's materials and products.
 - 2. Conform with all requirements of the City/Township and other agencies having jurisdiction.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data and installation instructions for underdrainage system materials and products.
- B. Certification: Submit certification signed by underdrainage system installer that installed materials conform to specified requirements and system was successfully checked and tested prior to covering with drainage fill.
- C. Record Drawings: At project closeout, submit as-built record drawings of installed underdrainage system piping and products.

PART 2 PRODUCTS

2.01 CONDUCTING PIPES AND PIPE FITTINGS

- A. General: Provide pipes of the following materials, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

2.02 PERFORATED DRAINS

- A. Finish drainage pipe complete with bends, reducers, adapters, couplings, collars and joint materials.
- B. Provide perforated, corrugated polyethylene tubing, 4 Inch diameter ASTM F 405.
- C. Manufacturer: Subject to compliance with requirements, provide foundation drainage system products of one of the following:
 - 1. Advance Drainage Systems, Inc.
 - 2. Plastic Systems, Inc.

2.03 TRENCH MATERIALS

- A. Drainage Fill: Evenly graded mixture of ¾ inch diameter clear natural stones.
- B. Filter Fabric: Approved non-woven cloth filter fabric.
 - 1. Terrafix 270R
 - 2. Mirafi 160N or approved substitutes

PART 3 EXECUTION

3.01 EXAMINATION

- A. Installer must examine the areas and conditions under which underdrainage system work is to be installed and notify the General Contractor in writing of conditions detrimental to the proper and timely completion of the work. Proceed with the work when unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.02 PERFORATED DRAINAGE SYSTEM

- A. Excavation:
 - 1. Excavate for underdrainage system to provide a clear horizontal distance between drain pipe and the trench walls, on both sides not less than 2 times diameter of drain pipe and sufficient depth to provide not less than 4 inch compacted impervious fill unless subgrade is already equivalent of impervious fill. Grade bottom of trench excavations to required slope and compact to a firm, solid bed for drain system.

B. Laying Drain Pipe:

1. Lay fabric into excavation in direct contact with adjacent subgrade. Allow sufficient fabric to encapsulate entire drainage profile lapping not less than 6 inches on top and 12 inch at edge.
2. Lay perforated pipe solidly bedded in filtering material.(3/4" stone) Provide full bearing for each pipe section throughout its length, to true grades and alignment, and continuous slope in the direction of flow.
3. Lay perforated pipe with perforations down and joints tightly closed in accordance with pipe manufacturers recommendations. Provide collars and couplings as required.
4. Connect pipe to storm system per plans. Provide coupling boot at catch basin connection to provide positive unobstructed flow.

C. Testing Drain Lines: Test or check lines before backfilling to assure free flow. Remove obstructions, replace damaged components, and retest system until satisfactory.

D. Drainage Fill:

1. Backfill drainage fill to encapsulate, cover and fill trench to within 4 inch of finish grade. Wrap drainage fill with excess filter fabric prior to backfilling with soil. Compact to depth as indicated in typical detail on drawings.
2. Fold filter fabric ends over top of trench, overlapping to ensure enclosure of drainage fill within filter fabric.
3. Install and compact topsoil over trench as indicated in typical detail.

3.03 BACKFILLING

- A. General: Conduct backfill operations closely following laying, jointing, and bedding of pipe, and after initial inspection and testing are completed.

3.04 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with all authorities having jurisdiction or as directed by the Engineer/Architect.

END OF SECTION 33 4616.19

APPENDIX A
Report on Geotechnical Investigation

French Landing Park Improvements
12090 Haggerty Road
Van Buren Charter Township, Michigan 48111

G2 Project 203164
June 22, 2020



Report on Geotechnical Investigation

**French Landing Park
Improvements
Haggerty Road, S. I-94
Service Drive
Van Buren Charter
Township, Michigan
48111**

Latitude 42.215493 ° N
Longitude -83.439965 ° W

Prepared for:

Russell Design, Inc.
114 Rayson Street, Suite 2A
Northville, Michigan 48167

G2 Project No. 203164
June 22, 2020



CONSULTING
GROUP

June 22, 2020

Mr. Mark R. Russell
Principal
Russell Design, Inc.
114 Rayson Street, Suite 2A
Northville, Michigan 48167

Re: Report on Geotechnical Investigation
French Landing Park Improvements
Haggerty Road, South of I-94 Service Drive
Van Buren Charter Township, Michigan 48111
G2 Project No. 203164

Dear Mr. Russell:

We have completed the geotechnical investigation within the French Landing Park located at the aforementioned address in Van Buren Charter Township, Michigan. This report presents the results of our observations and analyses and our recommendations for earthwork operations, foundation and pavement design, and construction considerations as they relate to the geotechnical conditions on site.

We appreciate the opportunity to be of service to Russell Design, Inc., and look forward to discussing the recommendations presented. In the meantime, if you have any questions regarding the report or any other matter pertaining to the project, please call us.

Sincerely,

G2 Consulting Group, LLC

Tyler S. Hesse, E.I.T.
Staff Engineer

TSH/JBS/jbs

Jason B. Stoops, P.E.
Associate / Office Manager



EXECUTIVE SUMMARY

We understand that the project consists of performing various improvements within the French Landing Park located in Van Buren Charter Township, Michigan. Moreover, we understand that a new kayak launch station, boardwalk, and canopy structure, as well as bituminous walkways and parking areas will be constructed.

Approximately 3 to 10 inches of sandy topsoil are present at the ground surface within B-03 through B-05. Medium compact sand and hard silty clay fill soils underlie the topsoil within B-04 and B-05 and extend approximately 2-1/2 feet below grade. Native very loose to loose granular soils consisting of sand and clayey sand are present at the ground surface within B-01 and B-02, underlie the topsoil within B-03, and underlie the fill soils within B-04 and B-05 extending to approximate depths ranging from 2 to 6-1/2 feet. Native very stiff to hard silty clay underlies the native granular soils and extends to the explored depths ranging from 15 to 35 feet. Groundwater measurements were performed during and upon completion of drilling operations. During drilling operations, groundwater was encountered at approximate depths ranging from 2 to 4 feet below existing grades. Upon completion, groundwater was measured at approximate depths ranging from 3 to 6 feet below existing grades. No groundwater was encountered during or upon completion of drilling operations within borings B-01 and B-03.

As previously stated, sand and silty clay fill soils were encountered at the ground surface within B-04 and B-05, respectively. These soils appear to have been placed in an engineered manner, have relatively low moisture contents, and may be left in place, provided they pass a proof roll evaluation.

Based on the information provided by Russell Design, Inc., the proposed boardwalk and kayak launch station will be supported on a deep driven timber pile foundation system. At the time of this report, information related to the diameter or design loads of the aforementioned timber piles were not available. However, for evaluation purposes, it will be assumed that the timber piles will be 12-inches in diameter with a 15 kip design load. Similarly, information related to tip elevations and stickup length of the timber piles were unavailable at the time of this investigation.

Based on our preliminary analyses, it appears that 12-inch nominal diameter timber piles embedded approximately 13 feet into the very stiff to hard native clays will provide an allowable compressive capacity of greater than 15 kips. A Factor of Safety of 3 was used in estimating the allowable capacities. The allowable estimated capacities of timber piling at alternative depths can be evaluated once loading conditions for the piles have been determined.

We anticipate caving and sloughing of the upper native granular and/or granular fill soils will occur during foundation and utility excavation operations. The contractor should, therefore, be prepared to over-excavate and form foundations, as necessary to prevent caving or sloughing and to provide smooth and vertical foundation sides to reduce the risk of frozen soil adhering to the concrete and raising foundations.

We anticipate that perched groundwater will be encountered within foundation and utility excavations extending below a depth of 2 to 4 feet. In consideration of the predominately cohesive soils, it is expected that any surface precipitation run-off water flowing onto the exposed subgrade and any groundwater can be reasonably controlled with temporary pumping from properly constructed sumps.

Do not consider this summary separate from the entire text of this report, with all the conclusions and qualifications mentioned herein. Details of our analysis and recommendations are discussed in the following sections and in the Appendix of this report.



PROJECT DESCRIPTION

We understand that the project consists of performing various improvements within the French Landing Park located in Van Buren Charter Township, Michigan. Moreover, we understand that a new kayak launch station, boardwalk, and canopy structure, as well as bituminous walkways and parking areas will be constructed.

At the time of this investigation, design loads for the boardwalk, kayak launch station, and canopy structure were not available; however, for evaluation purposes, it will be assumed that timber pile design loads will be approximately 15 kips, and the canopy structure single column loads will range from approximately ½ to 1 kips. It was reported to us that a supplemental geotechnical investigation will be required to provide timber pile design recommendations and construction considerations of the aforementioned boardwalk and kayak launch station; however, general preliminary recommendations are presented herein. Similarly, no information related to anticipated traffic frequencies was available at the time of this report; however, it will be assumed that traffic volumes are similar with other public park developments in the area.

Information related to existing and final site grades were not available at the time of this report. The recommendations presented within this report assume that future structures will be constructed within one foot of existing grades.

Once loading conditions, traffic conditions, and pavement grades have been determined, G2 should be notified so we can evaluate our recommendations presented herein. The purpose of our exploration is to determine and evaluate the general subsurface conditions within the French Landing Park and to develop recommendations for the subgrade preparation, foundation design, pavement design, and construction considerations as they relate to the geotechnical conditions on site.

SCOPE OF SERVICES

The field operations, laboratory testing, and engineering report preparation were performed under direction and supervision of a licensed professional engineer. Our services were performed according to generally accepted standards and procedures in the practice of geotechnical engineering in this area. Our scope of services for this project is as follows:

1. We drilled a total of five (5) soil borings throughout the French Landing Park. Soil borings B-01 and B-03 were performed within the vicinity of the proposed kayak launch station and boardwalk, respectively, extending to a depth of 35 feet each. Soil boring B-02 was performed within the vicinity of the proposed canopy structure extending to a depth of 15 feet. Soil borings B-04 and B-05 were performed within the vicinity of the proposed bituminous walkways and parking areas, respectively, extending to a depth of 15 feet each.
2. We performed laboratory testing on representative samples obtained from the soil borings. Laboratory testing included visual engineering classification, natural moisture content, and determination of Atterberg limits and unconfined compressive strength.
3. We prepared this engineering report. The report includes recommendations regarding subgrade preparation, soil bearing capacity, estimate settlement, pavement cross-sections, and construction considerations as they related to foundation and pavement construction.

FIELD OPERATIONS

Russell Design, Inc., in conjunction with G2, selected the depth and location of the soil borings. The boring locations were located in the field by G2 using conventional taping methods from known surface features prior to our drilling operations. The approximate soil boring locations are shown on the Soil Boring Location Plan, Plate No. 1. At the time of this investigation, topographic information at the soil boring locations was not provided.

The soil borings were drilled using a truck-mounted rotary drilling rig. Continuous flight 2-1/4 inch inside diameter hollow-stem augers were used to advance the borehole to the explored depths. Soil samples were obtained at intervals of 2-1/2 feet within the upper 10 feet and at intervals of 5 feet thereafter. The samples were obtained by the Standard Penetration Test method (ASTM D 1586), which involves driving a 2-inch diameter split-spoon sampler into the soil with a 140-pound weight falling 30 inches. The sampler is generally driven three successive 6-inch increments with the number of blows for each increment recorded. The number of blows required to advance the sampler the last 12 inches is termed the Standard Penetration Resistance (N). The blow counts for each 6-inch increment and the resulting N-value are presented on the soil boring logs.

The soil samples were placed in sealed containers and brought to our laboratory for testing and classification. During field operations, the driller maintained logs of the subsurface conditions, including changes in stratigraphy and observed groundwater levels. The final boring logs are based on the field boring logs supplemented by laboratory soil classification and test results. The boreholes were backfilled with auger cuttings upon completion of drilling operations.

LABORATORY TESTING

Representative soil samples were subjected to laboratory testing to determine soil parameters pertinent to foundation design and site preparation. An experienced geotechnical engineer classified the samples in general accordance with the G2 General Notes Terminology and applications of the Visual-Manual Unified Soil Classification System.

Laboratory testing included determination of natural moisture content, Atterberg limits, and unconfined compressive strength, which were determined in accordance with the following test methods:

- “Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)” (ASTM D4288);
- “Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass” (ASTM D2216);
- “Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils” (ASTM D4318);
- “Standard Test Methods for Unconfined Compressive Strength of Cohesive Soil” (ASTM D2166).

The unconfined compressive strengths were determined by ASTM Test Method D 2166, and using a spring-loaded hand penetrometer. Per ASTM Test Method D 2166, the unconfined compressive strength of cohesive soils is determined by axially loading a small cylindrical soil sample under a slow rate of strain. The unconfined compressive strength is defined as the maximum stress applied to the soil sample before shear failure. If shear failure does not occur prior to a total strain of fifteen percent, the unconfined compressive strength is defined as the stress at a strain of fifteen percent. The hand penetrometer estimates the unconfined compressive strength to a maximum of 4-1/2 tons per square foot (tsf) by measuring the resistance of the soil sample to the penetration of a calibrated spring-loaded cylinder.

The results of the moisture contents, as well as Atterberg limits and unconfined compressive strength determinations are presented on the individual soil boring logs, Figure Nos. 1 through 5, at the applicable depths. In addition, the results of the Unconfined Compressive Strengths determined in accordance with ASTM D 2166 and Atterberg limits determined in accordance with ASTM D 4318 are presented graphically in the Appendix as Figure Nos. 6 and 7, respectively. We will hold the soil samples for 60 days from the date of this report, after which time they will be discarded. If you would like the samples, please let us know.

SITE DESCRIPTION

The French Landing Park is located northwest of the Haggerty Road and Haggerty Highway intersection



in Van Buren Township, Michigan. The site currently consists of two (2) small maintenance buildings, a boardwalk and associated observation deck, and associated bituminous pavements. The remainder of the site is grass covered with select wooded areas. In addition, the site is bordered by Belleville Lake to the west and the surrounding properties are residential in nature. At the time of this report, information related to existing site grades was not available; however, based on visual observations, the site is generally flat with approximate grade changes of 3 to 5 feet.

SOIL CONDITIONS

Approximately 3 to 10 inches of sandy topsoil are present at the ground surface within B-03 through B-05. Fill soils consisting of sand and silty clay underlie the topsoil within B-04 and B-05 and extend approximately 2-1/2 feet below grade. Native granular soils consisting of sand and clayey sand are present at the ground surface within borings B-01 and B-02, underlie the topsoil within boring B-03, and underlie the fill soils within borings B-04 and B-05 extending to approximate depths ranging from 2 to 6-1/2 feet. Native silty clay underlies the native granular soils and extends to the explored depths ranging from 15 to 35 feet.

The sand fill soils are medium compact in relative density, with a Standard Penetration Test (SPT) N-value of 15 blows per foot (bpf). The silty clay fill soils are hard in consistency, with a natural moisture content of 11 percent, and an unconfined compressive strength of 9,000 pounds per square foot (psf). The native granular soils are very loose to loose in relative density, with SPT N-values ranging from 2 to 8 bpf. The native silty clay soils are very stiff to hard in consistency, with natural moisture contents ranging from 13 to 22 percent, dry densities ranging from 124 to 134 pounds per cubic foot (pcf), and unconfined compressive strengths ranging from 6,000 to in excess of 9,000 psf.

The stratification depths shown on the soil boring logs represent the soil conditions at the boring locations. Variations may occur between and away from the boring locations. Additionally, the stratigraphic lines represent the approximate boundaries between soil types. The transition may be more gradual than indicated. We have prepared the boring logs on the basis of the field logs of the soil conditions encountered supplemented by laboratory classification and testing.

The Soil Boring Location Plan, Plate No. 1, and Soil Boring Logs, Figure Nos. 1 through 5, are presented in the Appendix. The soil profiles described above are generalized descriptions of the conditions encountered at the boring locations. General Notes Terminology defining the nomenclature used on the soil boring logs and elsewhere in this report are presented on Figure No. 8.

GROUNDWATER CONDITIONS

Groundwater measurements were performed during and upon completion of drilling operations. During drilling operations, groundwater was encountered at approximate depths ranging from 2 to 4 feet below existing grades. Upon completion, groundwater was measured at approximate depths ranging from 3 to 6 feet below existing grades. No groundwater was encountered during or upon completion of drilling operations within B-01 and B-03. An estimate in the historical groundwater levels may be made based on the soil color change from browns (aerobic conditions where free oxygen is available) to grays (anaerobic condition where free oxygen is not available). This color change occurs at approximate depths ranging from 6-1/2 to 12 feet below the ground surface.

Fluctuations in perched and long term groundwater levels should be anticipated due to seasonal variations and following periods of prolonged precipitation. It should also be noted that groundwater observations made during drilling operations in predominantly cohesive soils are not necessarily indicative of the static groundwater level. This is due to the low permeability of such soils and the tendency of drilling operations to seal off the natural paths of groundwater flow.

SITE PREPARATION

We anticipate that earthwork operations will consist of complete removal of existing topsoil, trees,



vegetation, and root masses within the influence of the proposed structures and pavements, proof rolling / proof compacting the exposed subgrade, excavating for utilities and foundations, and preparing the site for pavement support. We recommend that all earthwork operations be performed in accordance with comprehensive specifications and be properly monitored in the field by qualified personnel under the direction of a licensed professional engineer.

At the start of earthwork operations, any existing topsoil, trees, or vegetation should be removed in their entirety from the proposed development areas. Any existing utilities within the footprint of proposed structures should be completely removed and backfilled with engineered fill. Existing utilities outside the proposed structural footings can be removed or abandoned in place and completely filled with grout.

At the time of this report, information related to final site grades was not available; however, it will be assumed that pavement grades will be within 1 foot of existing grades. Once pavement grades have been determined, G2 must be notified to evaluate their effect on our recommendations. The conclusions and recommendations presented in this report are not valid unless G2 reviews the changes. G2 will then confirm the recommendations presented herein or make changes in the writing.

After the existing topsoil has been completely removed within the proposed pavement areas, the exposed subgrade should be thoroughly proof rolled / proof compacted. Where granular soils are encountered, soils should be proof-compacted with a heavy smooth-drum vibratory roller and should be visually evaluated for instability and/or unsuitable soil conditions by a qualified geotechnical engineer or technician. We recommend 10 passes in two perpendicular directions during the proof-compaction operations. Where cohesive soils are encountered, soils should be proof-rolled with a fully loaded tandem-axle dump truck and evaluated for stability. We advise against the use of belly-pan scrapers for proof-rolling operations. Unsuitable soils or soils exhibiting excessive instability, such as severe rutting, should be improved with additional compaction or undercut to expose stable soils. Resulting excavations should be backfilled with engineered fill.

As previously stated, sand and silty clay fill soils were encountered at the ground surface within B-04 and B-05, respectively. These soils appear to have been placed in an engineered manner, have relatively low moisture contents, and may be left in place, provided they pass a proof roll / proof compaction evaluation.

Engineered fill should be free of organic matter, frozen soil, clods, or harmful material. The fill should be placed in uniform horizontal layers not more than 9 inches in loose thickness. The engineered fill should be compacted to achieve a dry density corresponding with 95 percent of the maximum dry density as determined by the Modified Proctor Compaction test (ASTM D1557). We recommend the use of granular fill soils within confined areas such as utility trenches and adjacent to foundation walls. Granular engineered fill is generally more easily compacted than cohesive soils within these confined areas. Additionally, the proper placement and compaction of backfill within these areas is imperative to provide adequate support for overlying floor slabs and pavements.

FOUNDATION RECOMMENDATIONS

Canopy Foundations

At the time of this report, information related to final site grades was unavailable. However, for evaluation purposes, it will be assumed that the canopy structure foundations will extend approximately 3-1/2 feet below existing grades. As previously mentioned, information related to type or structural loading conditions of the canopy structure foundations were not provided; however, it will be assumed that the canopy structure will be supported on conventional spread footings with column loads on the order of 1/2 to 1 kips. Once information related to anticipated loading conditions becomes available, G2 should be informed to reevaluate the recommendations presented herein.

We recommend that proposed canopy structure be constructed with conventional shallow spread



footings designed to bear within the native loose clayey sand soils. Foundations bearing within the native loose clayey sand soils can be designed with a net allowable soil bearing pressure of 2,000 psf. If a higher net allowable bearing capacity is desired, foundations can extend through the upper granular soils and bear within the underlying very stiff to hard silty clay. A net allowable soil bearing pressure of 6,000 psf can be used for foundation bearing within the very stiff to hard silty clay.

Exterior foundations must bear at a minimum depth of 3-1/2 feet below finished grade for protection against frost heave. We recommend G2 be on site during construction to observe the foundations excavations and verify the adequacy of the bearing soils.

If the recommendations outlined in this report are adhered to, total and differential settlements for the completed structure should be within 1 inch and 1/2 inch, respectively. We expect settlements of these magnitudes are within tolerable limits for the type of structures proposed. We recommend all foundations be suitably reinforced to minimize the effects of differential settlements associated with local variations in subsoil conditions.

Vertical Capacity of Driven Timber Pile Foundations

Based on the information provided by Russell Design, Inc., the proposed boardwalk and kayak launch station will be supported on a deep driven timber pile foundation system. At the time of this report, information related to the diameter or design loads of the aforementioned timber piles were not available. However, for evaluation purposes, it will be assumed that the timber piles will be 12-inches in nominal diameter with a 15 kip design load. Similarly, information related to tip elevations and stickup length of the timber piles were unavailable at the time of this investigation. In order to determine tip elevations and stickup length, a supplemental investigation will be required to determine the bottom elevation of Belleville Lake.

Based on our preliminary analyses, it appears that 12-inch diameter nominal timber piles embedded approximately 13 feet into the very stiff to hard silty clay will provide an allowable compressive capacity of greater than 15 kips. A Factor of Safety of 3 was used in estimating the allowable capacity. The allowable estimated capacities of timber piling at alternative depths can be evaluated if desired once the required loading conditions have been determined. If the boardwalk is supported on driven timber piling that extends at least beyond the minimum recommended pile tip elevations, total and differential settlement should be limited primarily to the elastic compression of the piling.

Lateral Capacity of Driven Timber Pile Foundations

Lateral loads may be resisted by the bending resistance of the timber piling and by the passive resistance of the adjacent soils. It may be assumed that the soils adjacent to a 12-inch nominal diameter timber pile can safely resist lateral loads imposed at the ground surface up to 4.5 kips. The lateral resistance of other pile sizes may be assumed to be proportional to the pile diameter.

In calculating the maximum bending moment in a pile, the lateral load imposed at the ground surface may be multiplied by an assumed moment arm of 3 feet. For design purposes, it may be assumed that the maximum bending moment will occur at the ground surface and that the bending moment will decrease to zero at a depth of 16 feet below the ground surface. Our estimates are based upon an allowable lateral deflection of 1/4 inch.

Alternatively, lateral loads can be resisted by installing the piling at a maximum batter of 1:3 (horizontal:vertical). The lateral capacity for 15-kip compression piles, based upon the lateral vector component, is 3.8 kips and 5 kips per pile for 1:4 and 1:3 (horizontal:vertical) batters, respectively.

Driven Pile Installation

Center-to-center pile spacing should not be less than 3 pile diameters to avoid any reduction in downward pile capacity due to group action. Variations in the depths and relative strength and



consistency of the soils from location to location may result in driving resistance differences; therefore, pile-driving refusal may be experienced at shallower elevations than estimated.

PAVEMENT RECOMMENDATIONS

We understand that bituminous pavements will be constructed for both parking areas and pedestrian pathways. Information related to final pavements grades or anticipated traffic frequencies were not available at the time of this report. Once this information becomes available, G2 should be notified to re-evaluate the recommendations presented herein.

We anticipate that standard duty flexible pavements will be utilized within the parking areas and associated access drives, with traffic consisting of regular passenger vehicles, and will be subjected to traffic loads on the order of 75,000 Equivalent 18-kip Single Axle Loads (ESALs) over a 20-year design life. Similarly, we anticipate that a standard duty flexible pavements will be utilized within the pedestrian pathway areas, with traffic consisting of primarily pedestrians and occasional maintenance vehicles, and will be subjected to loads on the order to 50,000 ESALs over a 20-year design life.

Provided the recommendations presented in the *SITE PREPARATION* section of this report are adhered to, we anticipate subgrade resilient moduli of 7,000 pounds per square inch (psi) can be used for the native granular and/or sand and silty clay fill soils. For evaluation purposes, we assumed a serviceability loss of 2.0, a standard deviation of 0.49, and a reliability of 90 percent.

Flexible Pavement Design – Standard-Duty – Parking Areas and Access Drives			
Material Type	Minimum Thickness (in)	Structural Coefficient	Structural Number (SN)
MDOT 5E1 Bituminous Wearing Course	1-1/2	0.42	0.63
MDOT 3C Bituminous Base Course	2	0.42	0.84
MDOT 21AA Aggregate Base Course (dense-graded)	8	0.14	1.12
Total SN →			2.59

Flexible Pavement Design – Standard Duty – Pedestrian Pathways			
Material Type	Minimum Thickness (in)	Structural Coefficient	Structural Number (SN)
MDOT 5E1 Bituminous Wearing Course	1-1/2	0.42	0.63
MDOT 3C Bituminous Base Course	1-1/2	0.42	0.63
MDOT 21AA Aggregate Base Course (dense-graded)	8	0.14	1.12
Total SN →			2.38

We recommend “stub” or “finger” drains be provided around catch basins to minimize the accumulation of water above and within any frost susceptible subgrade soils. The pavement and subgrade should be properly sloped to promote effective surface and subsurface drainage and prevent water from ponding. We also recommend pavement subbase materials consist of non-frost susceptible aggregates where possible. Any undercut areas within predominantly clayey soils should be connected with finger drains to the closest catch basins to drain water from within the granular undercut backfill material.

Regular timely maintenance should be performed on the bituminous pavement to reduce the potential deterioration associated with moisture infiltration through surface cracks. The owner should be prepared to seal the cracks with hot-applied elastic crack filler as soon as possible after cracking develops and as often as necessary to block the passage of water to the subgrade soils.



CONSTRUCTION CONSIDERATIONS

At the time of this report, information related to utility type, alignment, or depth were not available. Similarly, information related to the canopy foundation bearing depths were not available at the time of this report. However, for evaluation purposes, it will be assumed that utilities extend approximately 5 to 8 feet below existing grades and foundation excavations will extend 3-1/2 feet below existing grades. If this information becomes available; G2 should be notified to re-evaluate the recommendations presented herein.

We anticipate caving and sloughing of the upper native granular and/or granular fill soils will occur during foundation and utility excavation operations. The contractor should, therefore, be prepared to over-excavate and form foundations, as necessary to prevent caving or sloughing and to provide smooth and vertical foundation sides to reduce the risk of frozen soil adhering to the concrete and raising foundations. We anticipate that perched groundwater will be encountered within foundation and utility excavations extending below a depth of 2 to 4 feet. In consideration of the predominately cohesive soils, it is expected that any surface precipitation run-off water flowing onto the exposed subgrade and any groundwater can be reasonably controlled with temporary pumping from properly constructed sumps.

It should generally be expected that vertical or near-vertical excavations would be unstable. Where sufficient space is available, temporary unsurcharged trench and excavation sides should be sloped back. Temporary unsurcharged slopes may be cut at 2 horizontal units to 1 vertical unit (2H:1V) within the native very loose to loose granular soils and sand fill soils, and (3/4H:1V) within the native very stiff to hard cohesive soils for temporary excavations extending below a depth of 5 feet. Where seepage from excavation cuts is observed, the slopes will need to be flattened sufficiently to achieve stability, but in no case left steeper than 3H:1V at and below the seepage level. All excavations should be safely sheeted, shored, sloped, or braced in accordance with MI-OSHA requirements. If material is stored or equipment is operated near an excavation, lower angle slopes or stronger shoring must be used to resist the extra pressure due to the superimposed loads.

GENERAL COMMENTS

We have formulated the evaluations and recommendations presented in this report relative to site preparation and foundations on the basis of data provided to us relating to the project location, anticipate type of structure, and anticipated surface grades for the proposed site. Any significant change in this data should be brought to our attention for review and evaluation with respect to prevailing subsurface conditions. Furthermore, if changes occur in the design, location, or concept of the project, conclusions and recommendations contained in this report are not valid unless G2 Consulting Group, LLC reviews the changes. G2 Consulting Group, LLC will then confirm the recommendations presented herein or make changes in writing.

The scope of the present investigation was limited to evaluation of subsurface conditions for the support of anticipated structures and other related aspects of the development. No chemical, environmental, or hydrogeological testing or analyses were included in the scope of this investigation.

We base the analyses and recommendations submitted in this report upon the data from the soil borings performed at the approximate locations shown on the Soil Boring Location Plan, Plate No. 1. A supplemental investigation with additional soil borings will be required to provide final design recommendations of the timber pile foundation systems. This report does not reflect variations that may occur between the actual boring locations and the actual structure locations. The nature and extent of any such variations may not become clear until the time of construction. If significant variations then become evident, it may be necessary for us to re-evaluate our report recommendations.

We recommend G2 Consulting Group, LLC observe all geotechnical related work, including foundation construction, subgrade preparation, and engineered fill placement. G2 Consulting Group, LLC will perform the appropriate testing to confirm the geotechnical conditions given in the report are found




during construction.

APPENDIX

Soil Boring Location Plan	Plate No. 1
Soil Boring Logs	Figure Nos. 1 through 5
Unconfined Compressive Strength Test Results	Figure No. 6
Atterberg Limit Results	Figure No. 7
General Notes Terminology	Figure No. 8



Legend

 Soil Borings drilled by Triple R Drilling, LLC on May 23, 2020

Notes

1. Soil Borings B-01 and B-03 drilled to a depth of 35 feet.
2. Soil Borings B-02, B-04, and B-05 drilled to a depth of 15 feet.

Soil Boring Location Plan

French Landing Park
Haggerty Road, South of I-94 Service Drive
Van Buren Charter Township Michigan 48111



Project No. 203164

Drawn by: TSH

Date: 05/29/20

Scale: NTS

Plate
No. 1

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.216138° Longitude: -83.440223°



Soil Boring No. B-01
G2 CONSULTING GROUP

SUBSURFACE PROFILE			SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Very Loose Brown Sand with trace silt and gravel							
			2.0		1				
				S-01	1	2			
					5				
5		Very Stiff to Hard Brown Silty Clay with trace sand and gravel		S-02	6	13	18.8	124	6560
			5		7				
					S-03	12	24	16.1	9000*
			9.0						
10		Hard Mottled Brown and Gray Silty Clay with trace sand and gravel		S-04	10	22	17.1		9000*
						7			
			11.5						
		Very Stiff to Hard Silty Clay with trace sand and gravel			4				
15					S-05	7	17	15.6	8000*
						10			
					4				
20				S-06	7	18	16.0		8000*
			20		11				

SOIL / PAVEMENT BORING - 203164.CPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 35 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau
 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 Dry during and upon completion of drilling operations

Notes:
 * Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 1a

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.216138° Longitude: -83.440223°



Soil Boring No. B-01
G2 CONSULTING GROUP

SUBSURFACE PROFILE			SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
25		Very Stiff to Hard Silty Clay with trace sand and gravel (continued)	25	S-07	4 6 10	16	16.3		9000*
30			30	S-08	4 6 7	13	18.0		8000*
35			35	S-09	4 6 7	13	17.1		6000*
40			40	End of Boring @ 35 ft					

SOIL / PAVEMENT BORING - 203164.GPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 35 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau

 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 Dry during and upon completion of drilling operations

 Notes:
 * Calibrated Hand Penetrometer

 Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 1b

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.215753° Longitude: -83.439973°



Soil Boring No. B-02
G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Loose Brown Sand with trace clay and gravel	2.0	S-01	2 3 5	8			
5		Loose Brown Clayey Sand with trace gravel	5	S-02	1 2 5	7			
			6.5	S-03	3 7 8	15	13.7	134	12560
10		Hard Gray Silty Clay with trace sand and gravel	10	S-04	4 7 8	15	13.7		9000*
15		End of Boring @ 15 ft	15.0	S-05	4 7 11	18	14.5		8000*
20			20						

SOIL / PAVEMENT BORING - 203164.CPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 15 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau
 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 2 feet during drilling operations; 3 feet upon completion
 Notes:
 Borehole collapsed at 4 ft after auger removal
 * Calibrated Hand Penetrometer
 Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 2

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.215253° Longitude: -83.440292°



Soil Boring No. B-03
G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sand (8 inches)	0.7						
		Loose Light Brown Clayey Sand with trace gravel	3.0	S-01	2 3 3	6			
5			5	S-02	7 12 12	24	15.2		9000*
		Hard Mottled Brown and Gray Silty Clay with trace sand and gravel		S-03	8 13 18	31	14.6		9000*
10			10	S-04	12 17 23	40	13.8		9000*
		Very Stiff to Hard Gray Silty Clay with trace sand and gravel	12.0						
15			15	S-05	5 8 11	19	14.8		9000*
20			20	S-06	4 7 10	17	14.6		9000*

SOIL / PAVEMENT BORING - 203164.CPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 35 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau
 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 Dry during and upon completion of drilling operations

Notes:
 * Calibrated Hand Penetrometer

Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 3a

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.215253° Longitude: -83.440292°



Soil Boring No. B-03
G2 CONSULTING GROUP

SUBSURFACE PROFILE			SOIL SAMPLE DATA						
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
25		Very Stiff to Hard Gray Silty Clay with trace sand and gravel (continued)	25	S-07	4 6 8	14	16.2		9000*
30			S-08	4 7 8	15	14.6		7000*	
35			S-09	4 6 8	14	15.3		7000*	
35.0			End of Boring @ 35 ft						
40			40						

SOIL / PAVEMENT BORING - 203164.GPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 35 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau

 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 Dry during and upon completion of drilling operations

 Notes:
 * Calibrated Hand Penetrometer

 Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 3b

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.215493° Longitude: -83.439965°



Soil Boring No. B-04
G2 CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sand (10 inches)	0.8						
		Fill: Medium Compact Brown Sand with trace cobbles	2.5	S-01	5 7 8	15			
		Loose Light Brown Sand with trace silt and gravel	4.0						
5		Hard Brown Silty Clay with trace sand and gravel	5	S-02	3 3 4	7			
			7.0	S-03	5 9 9	18	20.3		9000*
10			10	S-04	6 9 10	19	14.9		9000*
			15.0	S-05	3 5 6	11	15.7		9000*
		End of Boring @ 15 ft							
20			20						

SOIL / PAVEMENT BORING - 203164.CPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 15 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau
 Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Water Level Observation:
 4 feet during drilling operations; 3 feet upon completion
 Notes:
 Borehole collapsed at 3 ft after auger removal
 * Calibrated Hand Penetrometer
 Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 4

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No. 203164
 Latitude: 42.215572° Longitude: -83.439490°



Soil Boring No. B-05

CONSULTING GROUP

SUBSURFACE PROFILE				SOIL SAMPLE DATA					
DEPTH (ft)	PRO-FILE	GROUND SURFACE ELEVATION: N/A	DEPTH (ft)	SAMPLE TYPE-NO.	BLOWS/6-INCHES	STD. PEN. RESISTANCE (N)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	UNCONF. COMP. STR. (PSF)
		Topsoil: Brown Sand (3 inches)	0.3						
		Fill: Hard Gray Silty Clay with trace sand, gravel, and pulverized asphalt (LL=49. PL=17)	2.5	S-01	4 5 6	11	10.6		9000*
		Loose Light Brown Clayey Sand with trace gravel	4.0						
5		Very Stiff Light Brown Silty Clay with trace sand and gravel, occasional cobbles	5	S-02	2 3 3	6			
			7.0	S-03	4 7 7	14	21.4		7000*
10		Hard Gray Silty Clay with trace sand and gravel	10	S-04	6 7 7	14	15.1		9000*
15			15.0	S-05	3 5 7	12	15.9		9000*
		End of Boring @ 15 ft							
20			20						

SOIL / PAVEMENT BORING - 203164.GPJ - 20150116.G2 CONSULTING DATA TEMPLATE.GDT - 6/10/20

Total Depth: 15 ft
 Drilling Date: May 23, 2020
 Inspector:
 Contractor: Triple R Drilling, LLC
 Driller: R. Rau

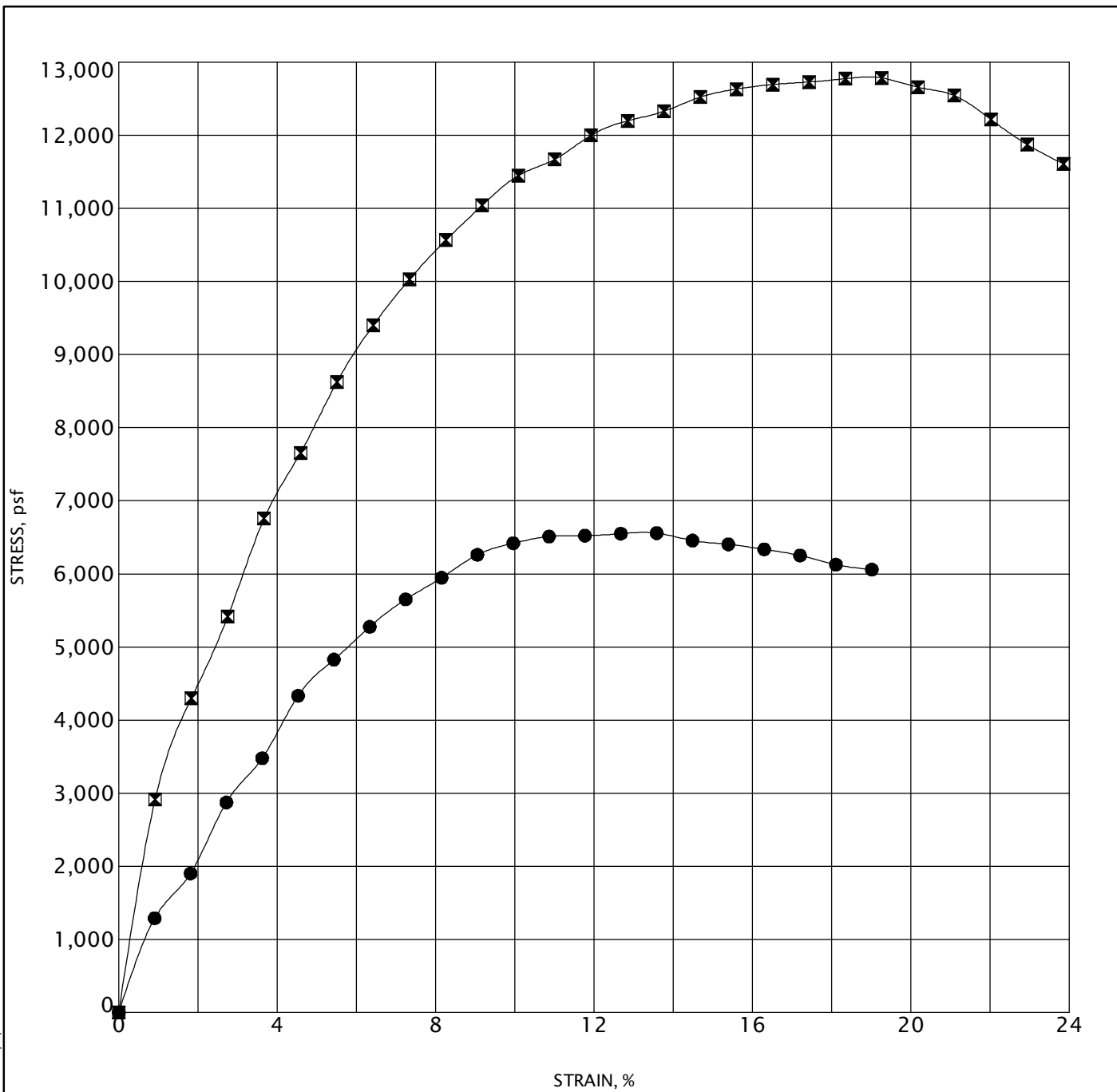
Water Level Observation:
 4 feet during drilling operations; 6 feet upon completion

Notes:
 Borehole collapsed at 6-1/2 ft after auger removal
 * Calibrated Hand Penetrometer

Drilling Method:
 2-1/4 inch inside diameter hollow-stem auger

Excavation Backfilling Procedure:
 Borehole backfilled with auger cuttings

Figure No. 5



Specimen	Classification	MC%	γ_d	UC
● B-01 S-02	Very Stiff Brown Silty Clay	19	124	6560
■ B-02 S-03	Hard Gray Silty Clay	14	134	12560



UNCONFINED COMPRESSIVE STRENGTH TEST

Project Name: French Landing Park Improvements
 Project Location: NW of Haggerty Road and Haggerty Highway Intersection
 Van Buren Charter Township, Michigan
 G2 Project No.: 203164

GENERAL NOTES TERMINOLOGY

Unless otherwise noted, all terms herein refer to the Standard Definitions presented in ASTM 653.

PARTICLE SIZE

Boulders	- greater than 12 inches
Cobbles	- 3 inches to 12 inches
Gravel - Coarse	- 3/4 inches to 3 inches
- Fine	- No. 4 to 3/4 inches
Sand - Coarse	- No. 10 to No. 4
- Medium	- No. 40 to No. 10
- Fine	- No. 200 to No. 40
Silt	- 0.005mm to 0.074mm
Clay	- Less than 0.005mm

CLASSIFICATION

The major soil constituent is the principal noun, i.e. clay, silt, sand, gravel. The second major soil constituent and other minor constituents are reported as follows:

Second Major Constituent (percent by weight)	Minor Constituent (percent by weight)
Trace - 1 to 12%	Trace - 1 to 12%
Adjective - 12 to 35%	Little - 12 to 23%
And - over 35%	Some - 23 to 33%

COHESIVE SOILS

If clay content is sufficient so that clay dominates soil properties, clay becomes the principal noun with the other major soil constituent as modifier, i.e. sandy clay. Other minor soil constituents may be included in accordance with the classification breakdown for cohesionless soils, i.e. silty clay, trace sand, little gravel.

Consistency	Unconfined Compressive Strength (psf)	Approximate Range of (N)
Very Soft	Below 500	0 - 2
Soft	500 - 1,000	3 - 4
Medium	1,000 - 2,000	5 - 8
Stiff	2,000 - 4,000	9 - 15
Very Stiff	4,000 - 8,000	16 - 30
Hard	8,000 - 16,000	31 - 50
Very Hard	Over 16,000	Over 50

Consistency of cohesive soils is based upon an evaluation of the observed resistance to deformation under load and not upon the Standard Penetration Resistance (N).

COHESIONLESS SOILS

Density Classification	Relative Density %	Approximate Range of (N)
Very Loose	0 - 15	0 - 4
Loose	16 - 35	5 - 10
Medium Compact	36 - 65	11 - 30
Compact	66 - 85	31 - 50
Very Compact	86 - 100	Over 50

Relative Density of cohesionless soils is based upon the evaluation of the Standard Penetration Resistance (N), modified as required for depth effects, sampling effects, etc.

SAMPLE DESIGNATIONS

- AS - Auger Sample - Cuttings directly from auger flight
- BS - Bottle or Bag Samples
- S - Split Spoon Sample - ASTM D 1586
- LS - Liner Sample with liner insert 3 inches in length
- ST - Shelby Tube sample - 3 inch diameter unless otherwise noted
- PS - Piston Sample - 3 inch diameter unless otherwise noted
- RC - Rock Core - NX core unless otherwise noted

STANDARD PENETRATION TEST (ASTM D 1586) - A 2.0 inch outside-diameter, 1-3/8 inch inside-diameter split barrel sampler is driven into undisturbed soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The sampler is normally driven three successive 6-inch increments. The total number of blows required for the final 12 inches of penetration is the Standard Penetration Resistance (N).